Zachary HAMIDA, Ph.D.

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RESEARCH & WORK EXPERIENCE

2021-present	Postdoctoral Research Associate **Polytechnique Montreal | Funding: Transportation Ministry of the Quebec Province** Formulating an approach for planning network-scale maintenance activities on the network of bridges in the province of Quebec. Developed an open-source software for infrastructure deterioration analyses.
2017-2020	Doctoral Research Assistant **Polytechnique Montreal | Funding: Transportation Ministry of the Quebec Province** Developed probabilistic models capable of modelling the deterioration behaviour and the effect of interventions based on visual inspections from a network of bridges.
2016-2017	Data Scientist **Find a Nurse | Startup** Worked on developing the nurse matching algorithm based on the needs of the clients.
2014-2017	Graduate Research Assistant **American University of Beirut | Funding: Schlumberger** Formulated an approach for optimizing the allocation of injection and production wells in oil reservoirs.

SOFTWARE DEVELOPMENT

Open-Source	**InfraPlanner:** (Python) Benchmark reinforcement learning environment for maintenance planning, - Emulate the deterioration process of transportation infrastructure. - Test and evaluate the effectiveness of maintenance policies. **OpenIPDM:** (MATLAB + GUI) Infrastructure probabilistic deterioration modelling, - Model the deterioration and effect of interventions based on visual inspections. - Generate synthetic data and calibrate the deterioration model parameters.

MENTORING EXPERIENCE

Teaching	**Teaching Assistant:** - CIV6540: Probabilistic Machine learning for Civil Engineers (Winter, 2021 | 2023) - CIV8530: Structural and System Reliability (Fall, 2022)
Co-supervisor	**Research Project Mentoring:** - Mouhcine Haddad, Ph.D. at Polytechnique Montreal (2022-present). - Ali Fakhri, M.Eng. at Polytechnique Montreal (2021-present). - Blanche Laurent, M.Eng. at Polytechnique Montreal (2020-2022, Degree earned).

CERTIFICATES & SCHOLARSHIPS

MAY 2023	Machine Learning Engineering Certificate. Toronto Institute of Data Science and Technology.
APR. 2021	Higher Education Teaching Certificate. Harvard BOK Center.
SEP. 2014	Graduate Research Assistantship (GRA). American University of Beirut, Beirut, Lebanon.
SEP. 2014	Partial Scholarship in Visual Communication. Istituto Europeo di Design (IED), Florence, Italy.

ACADEMIC & SOCIAL SERVICE

Reviewer:	- Journal of Petroleum Science and Engineering. - International Probabilistic Workshop (IPW).
Committee Member:	- 9th Annual Postdoctoral Research/Career Day. - Internal Selection Committee at Polytechnique Montreal for NSERC applications.

EDUCATION

2017-2020	Ph.D. in CIVIL ENGINEERING, **Polytechnique Montreal**, Montreal | Prof. James-A GOULET (Adviser) Thesis: "Stochastic Modelling of Infrastructures Deterioration and Interventions based on Network-Scale Visual Inspections" | Polytechnique Page
2014-2016	M.Sc. in COMPUTATIONAL SCIENCE, **American University of Beirut**, Beirut | Prof. George SAAD (Adviser) & Prof. Fouad AZIZI(Co-Adviser) Thesis: "Hybrid Optimization Techniques for Oil Field Development"
2008-2013	B.Eng. in CIVIL ENGINEERING **University of Aleppo**, Aleppo | Prof. Ammar KADAAN (Adviser) Final Year Project: "Structural Analysis & 4D Simulation for Multi-Storey Building"

JOURNAL PUBLICATIONS

1. **Hamida, Z.** & Goulet, J-A. (In Preparation, 2023). "Quantifying the Cost of Delaying Maintenance Actions on Transportation Infrastructure".

2. Fakhri, S. A. K., **Hamida, Z.** & Goulet, J-A. (In Preparation, 2023). "Using Bayesian Neural Networks for Integrating Structural Attributes in the Deterioration Analyses".

3. Laurent, B., Deka, B., **Hamida, Z.** & Goulet, J-A. (Submitted, 2022). "Analytical Inference for the Inspectors Uncertainty based on Network-Scale Visual Inspections".

4. **Hamida, Z.** & Goulet, J-A. (2023). "Hierarchical Reinforcement Learning for Transportation Infrastructure Maintenance Planning". Reliability Engineering and System Safety. DOI

5. **Hamida, Z.**, Laurent, B. & Goulet, J-A. (2022). "OpenIPDM: A Probabilistic Framework for Estimating the Deterioration and Effect of Interventions on Bridges". SoftwareX. DOI.

6. **Hamida, Z.** & Goulet, J-A. (2022). "A Stochastic Model for Estimating the Network-Scale Deterioration and Effect of Interventions on Bridges". Struct. Control & Health Monitoring. DOI.

7. **Hamida, Z.** & Goulet, J-A. (2021). "Quantifying the Effects of Interventions Based on Visual Inspections of Bridges Network". Structure and Infrastructure Engineering. DOI.

8. **Hamida, Z.** & Goulet, J-A. (2021). "Network-Scale Deterioration Modelling of Bridges Based on Visual Inspections and Structural Attributes". Structural Safety. DOI.

9. **Hamida, Z.** & Goulet, J-A. (2020). "Modeling Infrastructure Degradation from Visual Inspections Using Network-Scale State-Space Models". Struct. Control & Health Monitoring. DOI.

10. **Hamida, Z.**, Azizi, F. & Saad, G. (2017). "An Efficient Geometry-based Optimization Approach for Well Placement in Oil Fields". Journal of Petroleum Science and Engineering. DOI.

CONFERENCES & POSTERS

1. **Hamida, Z.** & Goulet, J-A. (2023). "Maintenance Planning for Bridges using Hierarchical Reinforcement Learning". 14th International Conference on Applications of Statistics and Probability in Civil Engineering. Dublin, Ireland.

2. Fakhri, S. A. K., **Hamida, Z.** & Goulet, J-A. (2023). "Bayesian neural networks for large-scale infrastructure deterioration models". 14th International Conference on Applications of Statistics and Probability in Civil Engineering. Dublin, Ireland.

3. **Hamida, Z.** & Goulet, J-A. (2022). "Modelling the Deterioration of Infrastructures Using Network-Scale Visual Inspections". 11th International Conference on Structural Health Monitoring of Intelligent Infrastructure. Montreal, Canada.

4. Laurent, B., **Hamida, Z.** & Goulet, J-A. (2022). "Estimating the Bias Associated with Inspectors in the Context of Visual Inspections on Infrastructures". 11th International Conference on Structural Health Monitoring of Intelligent Infrastructure. Montreal, Canada.

5. **Hamida, Z.** & Goulet, J-A. (2019). "State-Space Models for Network-Scale Analysis of Bridge Inspection Data". 13th International Conference on Applications of Statistics and Probability in Civil Engineering. Seoul, South Korea. DOI.

6. **Hamida, Z.** & Goulet, J-A. (2019). "Modeling Infrastructure Degradation from Visual Inspections Using Network-Scale State-Space Models". Modeling and Numerical Methods for Uncertainty Quantification (MNMUQ 2019), Porquerolles Island, France. DOI.