Gabriel San Martín Silva

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Education

University of California, Los Angeles — Los Angeles, CA, USA
Ph.D. Student in Civil and Environmental Engineering, GPA: 4.00/4.00 — 2021–Current

- Advisor: Enrique López Droguett
- Research: Quantum Computing, Probabilistic Graphical Modelling, Deep Learning and Risk and Resilience Assessment.

University of Chile — Santiago, Chile
M.S. in Mechanical Engineering, GPA: 4.00/4.00 — 2018–2020

- Thesis: "Semi- Supervised Learning with Temporal Variational Auto-Encoders for the Diagnosis of Failure Severities and the Prognosis of Remaining Useful Life".

University of Chile — Santiago, Chile
B.S. in Mechanical Engineering, GPA: 3.70/4.00 — 2012–2018

- Thesis: "Variational Auto-Encoder Model for the Identification of Failure Modes in Engineering Systems".

Research Experience

University of California, Los Angeles — Los Angeles, CA, USA
Graduate Student Researcher — Sept 2021 - Current

- John B. Garrick Institute for the Risk Sciences
- Researching and developing quantum computing approaches for risk and resilience applications. In particular, applying quantum Bayesian networks for the risk assessment of wildfire evacuation strategies.

University of Chile — Santiago, Chile
Research Assistant — March 2017 - March 2020

- Smart Reliability and Maintenance Integration Lab
- Researching and developing time-aware Variational Auto-Encoder models to perform condition based monitoring of industrial machinery.

Research Interests

- **Quantum Computing:** Quantum Bayesian Networks, Quantum Monte-Carlo, Quantum Probabilistic Inference.
- **Probabilistic Graphical Models:** Bayesian networks, Efficient Sampling Techniques.
- **Deep Learning:** Variational Auto-Encoders.
- **Emergency Scenario Simulation:** Applications of probabilistic graphical models to perform scenario simulation of wildfire emergencies.

Scholarships and Awards

- ASME SERAD IMECE 2021 Student Paper Competition - Honorable Mention Award 2021
- "Best Graduate 2020 - M.S Mechanical Engineering Program" by the University of Chile 2020
- Chilean Government Full Scholarship Award for M.S studies 2018–2020
- "Outstanding Engineering Student Award" by the University of Chile 2012–2018

Publications

Graduate Research - UCLA

[1] **San Martín, G.**, & López Droguett, E. (2022). Temporal Variational Auto-Encoders for Semi-Supervised Remaining Useful Life and Fault Diagnosis. IEEE Access, 1–1. https://doi.org/10.1109/ACCESS.2022.3174860

[2] Correa-Jullian, C., Cofre-Martel, S., **San Martín, G.**, López Droguett, E., de Novaes Pires Leite, G., & Costa, A. (2022). Exploring Quantum Machine Learning and Feature Reduction Techniques for Wind Turbine Pitch Fault Detection. Energies, 15(8), 2792. https://doi.org/10.3390/en15082792

[3] **San Martín, G.**, Parhizkar, T., & López Droguett, E. (2022). Quantum Fault Trees. ArXiv:2204.10877 [Cs, Eess]. http://arxiv.org/abs/2204.10877

[4] **San Martín, G.**, & López Droguett, E. (2021). Quantum Machine Learning for Health State Diagnosis and Prognostics. ArXiv:2108.12265 [Cs]. http://arxiv.org/abs/2108.12265

Graduate Research - University of Chile

[1] **San Martín, G.**, & López Droguett, E. (2021). Semi-Supervised Learning with Temporal Variational Auto-Encoders for Reliability. In Proceedings of the 31st European Safety and Reliability Conference (ESREL 2021). Proceedings of the 31st European Safety and Reliability Conference. Research Publishing Services. https://www.rpsonline.com.sg/proceedings/9789811820168/html/316.xml

[2] Kobrich, P., **San Martín, G.**, López Droguett, E., Bernardin, A., Ayele, Y.Z. (2019). Physics Based Deep Learning Model for Crack Propagation Prognostics. Proceedings of the 29th European Safety and Reliability Conference (ESREL). http://rpsonline.com.sg/proceedings/9789811127243/html/0323.xml

Undergraduate Research - University of Chile

[1] **San Martín, G.**, López Droguett, E., Meruane, V., & das Chagas Moura, M. (2019). Deep variational auto-encoders: A promising tool for dimensionality reduction and ball bearing elements fault diagnosis. Structural Health Monitoring, 18(4), 1092– 1128. https://doi.org/10.1177/1475921718788299

[2] **San Martín, G.**, Meruane, V., Droguett, E. L., Moura, M. C. (2018). A deep variational auto-encoder based dimensionality reduction for fault diagnosis in ball bearings. In Safety and Reliability–Safe Societies in a Changing World (pp. 1043-1050). CRC Press. Link