Nophi Ian D. Biton

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RESEARCH INTEREST

I am a civil engineer and a researcher who works in the field of structural reliability and optimal design. In my research, I explore and develop new methodologies to ensure structural safety under the explicit consideration of the effects of engineering uncertainties. By leveraging probabilistic methods, my goal is to ensure safety at the structure level and ultimately promote reliability and resilience at the urban community level. My broad research interests are:

- Structural System Reliability
- Reliability-based design optimization
- Multidisciplinary optimization
- Probabilistic analysis for earthquake engineering and disaster risk reduction studies

EDUCATION

Ph.D. – Civil Engineering Major in Disaster Management Engineering Sept. 2020 – August 2024 Ulsan National Institute of Science and Technology (UNIST) Ulsan, South Korea

Dissertation title: System-reliability-based design optimization of truss structures considering fatigue-induced sequential failure

M.S. in Civil and Construction Engineering

June 2015 – June 2017

National Taiwan University of Science and Technology (Taiwan Tech)

Taipei, Taiwan

Thesis title: Reliability-based design optimization using methods of moments

B.S. in Civil Engineering

June 2008 – May 2013

University of the Philippines - Diliman

Quezon City, Philippines

Thesis title: Constitutive relations of springs to model and simulate reinforced concrete frames

SCIENTIFIC ARTICLES

- Biton, N. I.[†] & Lee, Y.-J. (For submission). Multi-objective system reliability-based design optimization considering mixed aleatory and epistemic uncertainty on fatigue-induced sequential failures of trusses.
- **Biton, N. I.**[†], Kang, W.-H., Chun, J., & Lee, Y.-J. (2024). Probabilistic failure path approach on optimal design of structures against sequential fatigue-induced failure, Structural and multidisciplinary optimization, 67. https://doi.org/10.1007/s00158-024-03918-4

Peer Reviewed | Impact Factor: 3.6 | Quartile (SJR): Q1

• Biton, N. I.[†] & Lee, Y.-J. (2024). Structural system reliability-based design optimization considering fatigue limit state, Smart Structures and Systems. https://doi.org/10.12989/sss.2024.33.3.177

Peer Reviewed | Impact Factor: 2.1 | Quartile (SJR): Q2

• Liao, K. W., & **Biton**, N. I.[†] (2020). A heuristic moment-based framework for optimization design under uncertainty. Engineering with Computers, 1-14. https://doi.org/10.1007/s00366-019-00759-4

Peer Reviewed | Impact Factor: 8.7 | Quartile (SJR): Q1

 Liao, K. W., & Biton, N. I.[†] (2019). A heuristic optimization considering probabilistic constraints via an equivalent single variable Pearson distribution system. Applied Soft Computing, 78, 670-684. https://doi.org/10.1016/j.asoc.2019.03.021

Peer Reviewed | Impact Factor: 7.2 | Quartile (SJR): Q1

FELLOWSHIPS AND SCHOLARSHIP AWARDS

FAPESP Postdoctoral Fellowship funded by State of Sao Paulo, Brazil

Ulsan National Institute of Science and Technology Scholarship by Korean Government

Ministry of Science and Technology (MOST) Scholarship by Taiwan Government

Department of Science and Technology (DOST) PSHS Scholarship by Philippine Government

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Conference Presentation and Posters, Invited talks

- Biton, N. I.[†] (2025, May). System-reliability-based design optimization of truss structures considering fatigueinduced sequential failure. In Sao Paulo School of Advance Science on Structural Safety. Sao Paulo, Brazil. [Poster Presentation]
- Biton, N. I. (2024, October). Application of Machine Learning in Structural Engineering. In Seminar on coding and optimization tools for structural engineers. Association of Structural Engineers of the Philippines. [Invited talk]
- Biton, N. I. & Lee, Y.-J. (2024, September). Bayesian approach for addressing epistemic and aleatory uncertainty in the optimal fatigue design. In 8th Asia-Pacific Symposium on Structural Reliability and Its Applications (APSSRA 2024). Ulsan, South Korea. [Oral presentation]
- Biton, N. I. & Lee, Y.-J. (2023, August). Structural system reliability-based design optimization considering fatigue limit state. In the 2023 World Congress on Advances in Structural Engineering and Mechanics (ASEM23). Seoul, South Korea. [Oral presentation]
- Biton, N. I.† & Lee, Y.-J. (2023, July). Probabilistic failure path approach on structural system-reliability-based design optimization of fatigue-induced failure. In 14^{th} International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP14). Dublin, Ireland. [Oral presentation]
- Biton, N. I. & Lee, Y.-J. (2022, October). Reliability-based Design Optimization considering Fatigue limit state. In Korean Society of Civil Engineers Convention 2022. Busan, South Korea. [Oral presentation]
- Camanse, S. S., Biton, N. I. & Giduquio, M. B. (2019, October), Properties of Concrete using Fly ash as an Aggregate Micro-filler. In 16th Engineering Research and Development for Technology Conference. Manila, Philippines. [Poster presentation]
- Llanita, M. C., Biton, N. I.[†] & Giduquio, M. B. (2019, October). Mechanical Properties of Moderate-Slump Concrete Containing High-Volume Fly Ash. In 16^{th} Engineering Research and Development for Technology Conference. Manila, Philippines. [Poster presentation]
- Suarez, J. K., Cabacaba, K. M., Biton, N. I., Cuadra, C., Santiago, J., Mendoza, J., & Mahar Francisco Lagmay, A. (2015, April). Delft3D Storm Surge Simulation of Typhoon Haiyan for Projection of Coastal Inundation in the Visayas Islands, Philippines. In EGU General Assembly Conference Abstracts (Vol. 17). [Poster presentation]
- Cuadra, C., Suarez, J. K., Biton, N. I.[†], Cabacaba, K. M., Lapidez, J. P., Santiago, J., & Malano, V. (2014, May). Development of Inundation Map for Bantayan Island, Cebu Using Delft3D-Flow Storm Surge Simulations of Typhoon Haiyan. In EGU General Assembly Conference Abstracts (Vol. 16). Sapporo, Japan. [Poster presentation]

Teaching and Mentoring Experience

Cebu Technological University

Cebu City, Philippines

Sept. 2024 - May 2025

Delivered graduate level courses about finite element analysis and computer methods in structural analysis and design.

Far Eastern University – Institute of Technology

Manila, Philippines

Lecturer

Sept. 2021 - April 2022

Delivered review lectures for the Philippine Civil Engineering Licensure Examination. Created an online question bank for practice assessments. Taught numerical and structural analysis courses using Matlab programming software

University of San Carlos – Technological Center

Lecturer/Research Adviser

Cebu City, Philippines Nov. 2017 - May 2020

Taught undergraduate courses such as Statics of Rigid Bodies, Mechanics of Deformable Bodies, and Structural Theory. Developed course syllabi and prepared homework assignments, comprehensive exams, and solutions. Delivered lectures for graduate courses such as Finite Element Method and Structural Dynamics. Advised student's research focused on the structural optimization of standard government school buildings in the Philippines.

TECHNICAL SKILLS

Programming Languages: Matlab, Python

Structural Software: SAP2000, ETABS, SAFE, Xtract, OpeenSeesPy Spoken Language: Cebuano (Native), Filipino (Fluent), English (Fluent)

SHORT COURSES

- 9th International course on Seismic analysis using OpenSees
- São Paulo School of Advanced Science on Structural Safety

Training, Workshops and Seminars

- SAP2000 Structural Analysis and Design
- Association of Structural Engineers of the Philippines Design of Steel and RC SMRF
- Programming with MATLAB, Python Programming, Latex for Professional Publications
- Machine Learning, Neural Networks and Deep Learning
- Introduction to Uncertainty Quantification
- Optimization problems and Algorithms

Hobbies and interests

I enjoy exploring national parks and engaging in hiking and biking over shorter distances. I am interested in further expanding my skills in terms of scientific programming, machine learning and structural reliability. I share my scripts and personal notes at $\frac{https:}{github.com/nophibiton}$.