STEPHANE DAMOLINI

DATA SCIENTIST
+ STRUCTURAL ENGINEER
11 YEARS OF EXPERIENCE

stephane@damolini.com

US Green Card + French Citizen
Driver's License

ABOUT ME

MIT Engineer, problem solver, code writer, beta tester. Enthusiastic about machine learning, engineering, new technologies, and optimization.
Currently extending my data science & data science knowledge through online courses and freelance projects using Python.

www.damolini.com

SKILLS

WORK

- Data Processing
- Data Visualization
- Finite Elements and Numerical Modeling
- Statistics
- Programming
- Probabilistic Risk Assessments
- Fragility Analysis
- Structural Engineering
- Seismic Structural Analysis
- SQUG Walkdown Screening and Seismic Evaluation
- Soil and Structure Interaction (SSI)

SOFTWARE

- Python:
- (Pandas, Numpy, Keras, Tensorflow, scikit-learn, scipy, matplotlib, seaborn, shap)
- Excel VBA
- VB.NET
- ANSYS
- ACS-SASSI,
- Maple
- MATLAB

PROFESSIONAL EXPERIENCE

JENSEN HUGHES (2016 – present)
PRINCIPAL ENGINEER IV AND PROJECT MANAGER   Wakefield, MA

Project Management and Business Development

- Created the Data Automation & Machine Learning (DAML) initiative to promote efficiency throughout the company by automating tedious and repetitive tasks, and by leveraging machine learning to increase our edge over competitors.
- Led numerous Probabilistic Risk Assessment projects to compute Core Damage Frequencies of nuclear reactors in USA, Korea. Engineered in-house codes and programs advancing the state-of-the-art.
- Subject Matter Expert + Program Sponsor of Finite Element Program ANSYS.
- Project manager of the Hanul (South Korea) $100k seismic fragility analyses project that included development of In-Structure Response Spectra (ISRS) and calculation of CDFM (Conservative Deterministic Failure Margin) and SOV (Separation Of Variable) fragilities.
- Expert level consulting to EDF (Électricité de France) for Flamanville, France.

Data Processing and Optimization

- Authored a VB.NET time and frequency domain signal processing and converting software in a team of four using Atlassian suite. This program is used by many US and foreign utilities. Expected revenue greater than $100k/year.
- Developed a Python package to enhance the capabilities of highly specialized finite element program ACS-SASSI by adding custom functions to:
  - Automate model meshing
  - Verify integrity of stiffness matrix
  - Plot customizable, engineer friendly views of the model
  This has allowed to streamline development and verification of models resulting in 30%+ revenue increase.
- Created an EXCEL VBA signal processing program now used company-wide:
  - Imports and converts up to a million accelerograms into response spectra.
  - Automatically processes the spectra to provide seismic data as needed.
  - Performs deterministic or median-centered clipping (peak reduction).
  - Computes average, median and 86th percentile curves for use in probabilistic or deterministic analyses.
- Wrote MS-DOS batch files to run finite element analyses automatically, optimizing utilization and user efficiency.
- Initiated and implemented remote access to the supercomputer room, saving $120,000 worth of licenses and computers.
- Coded the company in-house database search engine in VB.NET, providing efficient access to power plant documents.
- Beta-tested and improved the in-house probabilistic event tree software

STEVENSON & ASSOCIATES (2009 – 2016)
LEAD ENGINEER   Woburn, MA

Highlights

- Developed 10+ state-of-the-art 3D Finite Element models of buildings and components, including a unprecedented adjustable resolution 3D model of a nuclear power plant allowing adaptative performance based on needs & computer resources
- Performed multiple 3D Soil-Structure Interaction Analyses (SSI) using 3D modeling of excavated soil elements (flexible volume method).
- Completed a transient thermo-structural analysis of a concrete filled steel column for the Phoenix Airport using FDS, Smokeview, and Abaqus.
- Supported Callaway, V.C. Summer, and Cook SPRA peer reviews.

Mathematical & Numerical Modeling

- Created a 30,000-node 3D ANSYS model of the Auxiliary-Control Building of the Callaway power plant in Missouri. Converted the model to a 3D ACS-SASSI model with soil elements (flexible volume approach) and ran a Soil-Structure Interaction (SSI) analysis including 50 layers of soil over 120 frequencies. Obtained time histories and response spectra, and organized them into a SpectraSA database. Performed a SPRA over 200+ pieces of equipment using the response data.

- Performed a SPRA for the D. C. Cook plant. Wrote a VBA macro to batch-process the 250,000 In-Structure Time Histories generated by the SSI analysis, automatically outputting the clipped In-Structure Response Spectra for each piece of equipment based on its exact location in the building, damping and natural frequency.
- Assessed and converted piping analysis models for eight piping systems using the FE program Superpipe for the $634K Fort Calhoun project. Screened and reviewed 100+ supports under seismic and accidental loads. Designed new piping supports and modified existing ones. Was promoted project manager for the support modification phase.
- Developed 2D and 3D high-fidelity models of the Control Building for the $2.6M VC Summer Nuclear Station project. Traveled on site and performed walkdowns inside the SC power plant, screened equipment for possible concerns during a seismic event. Accessed the Control, Auxiliary and Intermediate Buildings, including the Radiologically Controlled Areas. Used collected data to develop High-Confidence-of-Low-Probability-of-Failure accelerations for screened equipment.
- Created large-scale 3D structural building models including 3D Soil-Structure Interaction, a premiere in the industry, for the $400k KEPCO-E&C project. Wall thicknesses were modified to optimize the response to ground acceleration.
- Modeled elevators in 3D with ANSYS and conducted dynamic seismic response analyses for the $1.3M AREVA Mixed-Oxide Facility project in South Carolina. Replaced non-compliant termination springs.

Structural and Nuclear Engineering

- Project manager of the 4.2kV switchgear upgrade seismic qualification for Turkey Point Nuclear, FL, including the current limiting reactor.
- Performed a seismic walkdown at the Seabrook Nuclear station in New Hampshire. Screened and collected data for the Supplemental Emergency Power System, including a 2700kW generator. Performed seismic fragility calculations.
- Performed a seismic walkdown at V.C. Summer Nuclear station in South Carolina. Inspected equipment in the Control, Auxiliary and Intermediate Buildings, including the Radiologically Controlled Areas.
- Created a large-scale 3D structural building models including 3D Soil-Structure Interaction, a premiere in the industry at the time, for the new design of KEPCO-E&C Kori unit 5 and 6. The wall thicknesses were modified to optimize the response to ground acceleration.
- Modeled AREVA MOX Project elevators in 3D with ANSYS and conducted dynamic seismic response analyses for the $1.3M AREVA Mixed-Oxide Facility project in South Carolina. Designed the replacement of non-compliant termination springs.
- Originated a $1.5M proposal and met with Électricité de France (EDF) in Lyon for the Fessenheim / SF60 SPRA project.
- Represented Stevenson & Associates at numerous career fairs and interviewed candidates.

EDUCATION & PROFESSIONAL REGISTRATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT)
GPA: 5.0/5.0   2008-2009
Master of Civil and Environmental Engineering   Cambridge, MA

ÉCOLE SPECIALE DES TRAVAUX PUBLICS (ESTP)
Ranked 4/500   2006-2008
Master of Science in Civil Engineering and Construction   Paris, FR

JANSON DE SAILLY   2004-2006
BSc in advanced mathematics, statistics, physics, and computer science   Paris, FR

SQUG QUALIFIED SEISMIC CAPABILITY ENGINEER   since 2011

PUBLICATIONS

[1] Machine Learning Assisted Seismic Probabilistic Risk Assessments, expected summer 2021

[2] Finite Element Analysis of a Large Diesel Generator Fuel Oil Storage Tank: A Case Study, SMiRT-25, August 2019.

[3] Seismic SSI Analysis Comparison between Detailed and Discretized Modeling of an Auxiliary Control Building, SMiRT-24, August 2018.

[4] A Case Study on the Effect of Detailed 3D Finite Element Modeling on Nuclear Power Plant Building Response, SMiRT-23, August 2015.

[5] Carbon Nanotubes and Their Application to Very Long Span Bridges, MIT, 2009: Wrote a program that computes the strength of a kilometer-long cable made of 10^{28} carbon nanotubes, using a multiscale stochastic simulation. Optimized the code to run the entire analysis in a minimal time.

INDEPENDENT LEARNING

Coursera Completed Classes & Certifications

- AWS Fundamentals: Going Cloud-Native
- Deep Learning Specialization
- Sequence Models
- Convolutional Neural Networks
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Neural Networks and Deep Learning
- Data Science Professional Certificate
- IBM Data Science Professional Certificate
- IBM Data Science Specialization
- Applied Data Science Capstone
- Machine Learning with Python
- Data Analysis with Python
- Data Visualization with Python
- Databases and SQL for Data Science
- Machine Learning
- Data Science Methodology
- Data Science Orientation
- Open Source Tools for Data Science
- Python for Applied Data Science
- A Crash Course in Data Science
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization

Diplomas and credentials available on https://www.linkedin.com/in/damolini/.

OTHER INTERESTS

Guitar playing, Sailing, Photography, Skiing, Mechanics, Marathon Finisher.