

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 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

PROFESSIONAL EXPERIENCE

JENSEN HUGHES
PRINCIPAL ENGINEER AND DATA ANALYST

2016 – present
Wakefield, MA

Data Modeling and Automation

- 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, South Korea, and France. 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.
- Lead developer of the company's cost estimate tool (Excel-VBA) used for bidding

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 \$200k/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 modelThis has allowed to streamline development and verification of models resulting in a 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
LEAD ENGINEER

2009 – 2016
Woburn, MA

Highlights

- Developed 10+ state-of-the-art 3D Finite Element models of buildings and components, including unprecedented adjustable resolution 3D model of a nuclear power plant allowing adaptive 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

- seaborn
- shap
- Flask/Heroku
- Excel VBA
- VB.NET
- ANSYS
- ACS-SASSI,
- Maple
- MATLAB
- MathCAD
- Atlassian Suite
- GIT
- AWS
- ADINA
- Pipestress
- Superpipe
- GT-STRUDL
- PD-STRUDL
- SpectraSA
- SultanSA
- EKSSI,
- Turbo Pascal,
- OCaml
- Jekyll

SOFT SKILLS

Problem-Solving
 Attention to Detail
 Efficiency & Automation
 Inquisitive
 Collaboration

Languages

French (native)
 English (fluent)
 Spanish (conversational)

- 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

Master of Civil and Environmental Engineering

2008-2009

Cambridge, MA

ÉCOLE SPECIALE DES TRAVAUX PUBLICS (ESTP)

Ranked 4/500

Master of Science in Civil Engineering and Construction

2006-2008

Paris, FR

JANSON DE SAILLY

BSc in advanced mathematics, statistics, physics, and computer science

2004-2006

Paris, FR

NOTRE DAME DES OISEAUX

High school diploma, magna cum laude

1991-2004

Paris, FR

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

Semi-professional photographer; accomplished baguette baker, self-taught acoustic guitarist, intermediate to advanced skier in the winter; beginner to intermediate sailor in the summer; enthusiast of mundane and ubiquitous data; active XDA contributor.