Erik Giesen Loo

Software Engineer
Data Analyst

The Netherlands
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Skills

- Algorithms & data structures
- Computational modelling
- Game development
- Data analysis

Computer

- C++ ●●○○
- Python ●●●●
- JavaScript ●●○○
- MATLAB ●●●●
- Linux ●●○○
- LaTeX ●●●○

Languages

- English ●●●●●
- Spanish ●●●●●
- Dutch ●●●●●
- German ●●●○○
- Japanese ●●○○○

Personal Summary

A skilled engineer offering software development and data analysis services. I did my Master's at TU Delft, where I specialised in Computational Mechanics. I enjoy developing software in C++ and Python for analysing and visualising data. My interests are computational structural mechanics, data analysis, and software development.

Experience

Software Developer, *Giesen Engineering Consultancy*, NL. Oct 2023 – Present

- Created data analysis and visualisation software in Python to assess motorway performance
- Developed congestion prediction triggers for reducing speed limits to improve traffic flow
- Automated data collection, processing, and distribution of daily and monthly reports

Design Engineer, *Roughan & O'Donovan*, UK. Oct 2018 – Sep 2023

- Analysed data for the M50 enhancing Motorway Operation Services (eMOS) project
- Developed a traffic flow breakdown probabilistic model to fine-tune lane control signals
- Developed operational metrics to evaluate motorway performanance

Research Assistant, *Bucknell University*, USA. Summer 2015, Summer 2016

- Researched the lateral torsional buckling stability of steel joists and crane girders
- Performed background studies for a new 2nd-order analysis method in AISC 360-16

Education

Delft University of Technology, *The Netherlands*. Sep 2016 – Sep 2018

M.Sc. Civil Engineering (Cum Laude), *grade: 8.3/10*

- Track: Structural Engineering
- Specialisation: Structural Mechanics
- Thesis: *"Weak periodic boundary conditions: Effect on principal stress due to axial load under varying orientations"*
- Additional Thesis: *"Quantifying the influence of membrane forces, curvature, and imperfections on the nonlinear buckling load of thin-shells"*

Bucknell University, *USA*. Aug 2012 – May 2016

B.Sc. Civil Engineering (Magna Cum Laude), *GPA: 3.8/4.0*

- Thesis: *"Design of Steel Structures by Advanced 2nd-Order Elastic Analysis - Background Studies"*

Certificates

Introduction to Machine Learning, *Duke University*. May 2021

- Logistic Regression, Multilayer Perceptron
- Convolutional Neural Networks
- Recurrent Neural Networks, Long Short-Term Memory

Algorithms Specialisation, *Stanford University*. Apr 2021

- Divide and Conquer, Sorting and Searching, and Randomized Algorithms
- Graph Search, Shortest Paths, and Data Structures
- Greedy Algorithms, Minimum Spanning Trees, and Dynamic Programming
- Shortest Paths Revisited, NP-Complete Problems and What To Do About Them

Accelerated Computer Science Fundamentals, *University of Illinois at Urbana-Champaign*. Sep 2020

- Object-Oriented Data Structures in C++
- Ordered Data Structures
- Unordered Data Structures

Programming in JIVE, *Dynaflow Research Group*. Jun 2018

- Learned how to use Jive – an open source research-oriented C++ programming toolkit for solving partial differential equations

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Memberships

Koninklijk Instituut Van Ingenieurs

Chi Epsilon Civil Engineering Honor Society

Journal Papers

Giesen Loo E, Corbally R, Feely L, O'Sullivan A. Enhanced Motorway Capacity Estimation Considering the Impact of Vehicle Length on the Fundamental Diagram. *IET Intelligent Transport Systems.*. 2024; Under Review.

Giesen Loo E, van der Meer FP. Stress-controlled weakly periodic boundary conditions: Axial stress under varying orientations. *Int J Numer Methods Eng*. 2020;1–13. https://doi.org/10.1002/nme.6441

Conference Publications

Corbally R., Giesen Loo E., Feely L., O'Sullivan A.. Data-Driven Motorway Traffic Flow Optimisation in Ireland using Variable Speed Limits.. *Proceedings of 30 th ITS World Congress, Dubai, UAE, 16-20 September 2024.*. 2024, Under Review.

Giesen Loo E., Corbally R., Feely L., O'Sullivan A.. Motorway traffic flow optimization: from theory to practice.. *Proceedings of 11 th Transport Research Arena TRA Conference*. 2024, Accepted.

Corbally R., Giesen Loo, E., Feely, L., O'Sullivan A.. Leveraging multiple data sources to measure the impact of variable speed limits on Ireland's M50-motorway. *Proceedings of 11 th Transport Research Arena TRA Conference.*. 2024, Accepted.

Giesen-Loo E., Corbally R., Feely L., O'Sullivan A.. A study of fundamental traffic behaviour and factors influencing motorway capacity. *ITS European Congress. Lisbon,s*. 2023.

Projects

My Portfolio. Jul 2021

- My first venture into learning html, css & javascript
- Sourcecode: `https://github.com/erikjloo/erikjloo.github.io`

Fourgotten, *GMTK Game Jam*. Jun 2021

- Worked collaboratively with a team to develop a game in 48 hours
- Sourcecode: `https://github.com/Archeologits/GMTK-GJ-21`

Python FEM. Jan 2020

- A modular object-oriented finite element analysis library
- Sourcecode: `https://github.com/erikjloo/Python-FEM`

Weakly Periodic Boundary Conditions. Feb 2020

- A novel boundary conditions model for the homogenisation of microscale elements in multiscale finite element analyses, coded in C++ using the Jem & Jive FEM libraries
- Sourcecode: `https://github.com/erikjloo/WeakPeriodicBC`