KIRSTEN ODENDAAL

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Summary

As an internationally experienced engineer (E.I.T) passionate about data science and AI, I have transitioned to applying my technical skills in the AI/ML field. Motivated by solving complex problems through data-driven insights, I aim to blend my engineering background with cutting-edge AI expertise.

Education

Georgia Institute of Technology, Atlanta, USA — Expected: September 2026
MSc. in Computer Science (Machine Learning and Artificial Intelligence)

Delft University of Technology, Delft, NL — July 2021
MSc. in Maritime Technology (Ship Design, Production, Operation): 4.0 GPA (Cum Laude)

University of Alberta, Calgary, CA — September 2019
BSc. in Mechanical Engineering: 3.7 GPA (Distinction)

Awards

- MARITIME DESIGNER OF THE YEAR, Netherlands Maritime Awards Gala — July 2022
  - National Recognition of outstanding and innovative work in researching, developing, and reporting a novel grey-box modelling methodology to estimate total vessel energy consumption using operational data and advanced analytic techniques for improved early staged vessel design.
- CAPSTONE DESIGN AWARD, Thorsten Watterodt Award for Excellence in Design — May 2019
  - Recognition of outstanding and innovative work in design procedures, finite element analysis, topographical optimization, material property evaluation, 3D manufacture utilization, computer-aided design (SolidWorks) and detailed drawing development (GD&T) in the complete design of an Unmanned Aerial Manipulator (UAM)

Experience

Technical Project Manager: Powering and Concept, MARIN – *Wageningen, NL* — October 2021 – Present
- Managed end-to-end projects and directed tool development, generating approximately €375,000 in annual revenue while pursuing new business opportunities and professional collaborations
- Led FOIL JIP data science team to implement data-driven pipeline techniques and time-series models, creating an AWS cloud web application that improved dynamic performance predictions and accelerated simulation speed by over 98%
- Improved off-design performance prediction accuracy by 10% using a machine learning model that bridges CFD and full-scale data through active learning and belief-state quantification
- Re-designed the MARIN engine design tool (MEC) into an NSGA-based optimization framework, managing multi-objective constraints and creating a commercially viable service

Graduate Researcher, De Voogt Naval Architects, TU Delft – *Haarlem, NL* — November 2020 – June 2021
- Achieved national recognition for innovative research and development of a novel grey-box modeling methodology to estimate total vessel energy consumption using real-world operational data, enhancing early-stage vessel design
- Collaborated with a multidisciplinary team to integrate machine learning models into existing workflows, applying Python and TensorFlow, and implementing best practices such as exploratory data analysis and data cleaning to enhance performance and model generalization
- Published research findings in a peer-reviewed (Tier I) journal, contributing to the academic community (publicly *available*)

Marine Design Engineer (Internship), Damen Yachting – *Vlissingen, NL* — June 2020 – October 2020
- Developed a MATLAB framework to replicate and assess the sensitivity of a commercial engineering software, investigating the feasibility of longitudinal strength weight simplifications through a numerical model sensitivity study
- Realized time-savings of 25% to 30% during basic engineering phases while ensuring accuracy deviations within 10%, allowing for new metrics for earlier informed decision-making

Assistance Technical Project Manager (Internship), Silverseas – *Palermo, IT* — March 2018
- Gained engineering project management and technical experience assisting the lead technical project manager for the world's first-ever luxury cruise ship 50ft extension and complete rejuvenation (Silver Spirit)

Thermal Development Engineer (Co-op), Husky (Cenovus) – *Calgary, CA* — September 2017 – August 2018
- Assist development teams with information gathering, analysis, technical software aid, regulatory approval reports, timeline generation, and implementation to support key development objectives
- Utilized VBA scripting to systematically develop parametric type-curves using curve-fitting and decay analysis approaches for forecasting future well production, ensuring accuracy in long-term planning

Mechanical Systems Design Engineer (Co-op), STANTEC – *Red Deer, CA* — August 2016 - May 2017
- Applied mechanical engineering principles to efficiently design mechanical systems within commercial buildings and facilities using 2D/3D CAD software
- Ensured compliance with applicable codes, standards, and regulations in the real-world integration of mechanical structures
- Analyzed the energy and economic impact of HVAC systems using TRACE 700 energy modeling software
- Coordinated mechanical system design with other professional disciplines, including architecture, structural engineering, electrical engineering, civil engineering, and construction

Projects

LLM Based PDF Summarizer github.com/kodendaal/rag_pdf_visualizer

- Developed a Retrieval-Augmented Generation (RAG) based Language Model (LLM) to interact with and summarize general PDF's (marketing material), enhancing personalized client experiences and direct knowledge transfer
- Utilized a novel open-source LangChain framework and integrated local conversational LLM and vector database tools to reduce the risk of hallucinations and privacy leaks.
- Created a Gradio UI for an interactive presentation, demonstrating the approach to upper management and securing further R&D investment for future integration within external and internal applications

Skills

Languages: Python, MATLAB, R, VBA, LaTeX
Frameworks/Technologies: Git, SVN, Langchain, Hugging Face, CUDA, Microsoft Suite
Packages: Gradio, SkLearn, Pytorch, Tensorflow, Pandas, Scipy, Numpy
Design/CAD: SolidWorks, Rhino3D, AutoCAD, MAXSURF, REVIT MEP, STAR-CCM+ (CFD), ANSYS APDL/Workbench (FEA)
O&G: PVR, GFR, OFM, Mosaic, DB Reporter, Spotfire, IHS Accumap, SAP, Palantir CASH, FDC, SCADA
Certificates/Training: Statistics & Data Science (MITx), Intro to Python Programming (GTx), Statistical Learning (Stanford|O)
Other: Canadian Citizen and authorized to work for any US employer (TN status)

Publications

1. **DESIGN FOR OPERATION**, K. Odendaal, L. F. Minerva, G. Loeff, 27th HISWA Symposium, 2022.
2. **HYDRO-SYSTEM EVALUATION FOR HULL FORM OPTIMIZATION: A MEC APPROACH for operation**, K. Odendaal, U. Shipurkar, 27th HISWA Symposium, 2022.
3. **ENHANCING EARLY-STAGE ENERGY CONSUMPTION PREDICTIONS USING DYNAMIC OPERATIONAL VOYAGE DATA: A GREY-BOX MODELLING INVESTIGATION**, K. Odendaal, A. Alkemade, A. A. Kana, International Journal of Naval Architecture and Ocean Engineering, (https://doi.org/10.1016/j.ijnaoe.2022.100484), 2022
4. **A BIRD'S EYE VIEW OF MACHINE LEARNING IN THE YACHTING INDUSTRY**, K. Odendaal, SWZ|Maritime Article, 2023
5. **INTEGRATING HYDRODYNAMICS WITH POWER POSES CHALLENGE**, K. Odendaal, U. Shipurkar, SWZ|Maritime Article, 2023