DR. PETER ZORVE

Data Scientist / Computational Chemist / AI Engineer

+358417289032 / zorvepeter2802@gmail.com / Suksisepäntie 8 D 61, 50160, Mikkeli, Finland

PROFILE

My main educational background includes Mathematics and Chemistry. I also have Artificial Intelligence (AI) engineering, Data Science / Data Analysis, Machine Learning (ML), Deep Learning (DL), and strong Python programming language background. My long–term goal is to become an expert researcher by applying my knowledge of AI engineering, machine learning, deep learning, and data science skills. I am ever ready to learn a new set of skills that come with this job and take up as many responsibilities related to this position. I am ready to work as a team member and encourage others if need be.

PERSONAL SKILLS AND ABILITIES

Able to work very effectively with no or little supervision
Able to combine work responsibilities with leadership positions
Able to work both independently and in a team
Have good written and verbal communication skills
Able to build, develop, and maintain trust and effective work relationships
Able to learn a completely new set of skills in a very short period of time

EDUCATIONAL BACKGROUND

Jan 2022 – Sep 2022 **AI Engineering / Data Science / Data Analysis, Epicode Global School, Italy**
AI Engineering, Data Engineering, Deep Learning, Machine Learning and Machine Learning Algorithms, and Software Engineering

Jan 2021 – Jul 2021 **Postdoctoral Researcher (Computational Chemistry), University of Eastern Finland, Finland**
Project: Unraveling the Mechanism of Catalytic Preparation of Polyolefins in the Heterogeneous Ziegler-Natta Catalysis
Project Leader: Prof. Mikko Linnolahti

Feb 2018 – Dec 2020 **Doctor of Philosophy (Computational Chemistry), University of Eastern Finland, Finland**
Dissertation: Structures and Reactions of $TiCl_4$-Adsorbed $MgCl_2$ Crystallites in Ziegler-Natta Olefin Polymerization Catalysis
Supervisor: Prof. Mikko Linnolahti

Sep 2016 – Jan 2018 **Master of Science (Computational Chemistry), University of Eastern Finland, Finland**
Thesis: DFT Study of the Adsorption of Titanium Tetrachloride on Magnesium Dichloride Surfaces in the Heterogeneous Ziegler-Natta Catalytic System
Supervisors: Prof. Emer. Tapani Pakkanen and Prof. Mikko Linnolahti

Sep 2010 – May 2014 **Bachelor of Science (Chemistry), University of Cape Coast, Ghana**
Thesis: Colorimetric Determination of Carbohydrates in Foodstuffs as a Function of Type II Diabetes
Supervisor: Prof. Yaw Opoku Boahen

Jun 2006 – Jun 2009 **West African Senior School Certificate, Armed Forces Secondary/Technical School, Ghana**
Program: General Science
Major Subjects: Mathematics (Elective), Biology, Chemistry, Physics

PREVIOUS WORK / RESEARCH EXPERIENCES

Jan 2018 – Date **Entrepreneur, PZ Company Ltd, Finland, Business ID: 3131777-2**
Responsibilities:
Partnership with Wolt Enterprises Oy, Finland
Partnership with Delivery Finland Oy, Finland

Jan 2021 – Jul 2021 **Postdoctoral Researcher, Chemistry Department, University of Eastern Finland, Finland**
Responsibilities:
Modeling of complex molecular structures.
Running experiments and simulations of the modeled chemical structures.
Data analysis and interpretation of the obtained results.
Reviewing and writing scientific manuscripts.

Feb 2018 – Dec 2020 **Early-Stage Researcher, Chemistry Department, University of Eastern Finland, Finland**
Responsibilities:
Molecular modeling of complex structures and simulating the chemical properties of modeled structures.
Interpreting the results from the chemical simulations.
Writing and publishing scientific manuscripts based on the results/data obtained.
Co-supervising international master's students.

Feb 2018 – Dec 2020 **Co-supervisor of M.Sc. Students, Chemistry Department, University of Eastern Finland, Finland**

Responsibilities
Assisting M.Sc. students with the concept of theoretical chemistry and molecular modeling.
Assisting M.Sc. students with modeling molecular structures and simulating the chemical properties of the modeled structures.
Reading and assessing the report produced by the M.Sc. students.

Sep 2021 – Feb 2022 **Newsletter Courier, Jakelusepät Oy, Finland**
Responsibilities
Delivering letters, newsletters, magazines, etc., to home addresses.
Driving long distances for the job.

Jun 2015 – Aug 2016 **Mathematics and Science Teacher, Peter Holdbrooks-Smith Senior High School, Ghana**
Responsibilities
Teaching Mathematics and Science in a Senior High School.
Preparing the curriculum for both Mathematics and Science. This curriculum is the blueprint used for teaching.
Setting quizzes and examination questions for the students.
Grading and assessing students at the end of every semester.

May 2014 – Jun 2015 **Teaching Assistance, Chemistry Department, University of Cape Coast, Ghana**
Responsibilities
Assisting lecturers in teaching when they are unavailable.
Organizing tutorials for bachelor's students.
Grading and assessing the bachelor students at the end of the semester.
Conducting experiments with the students.

PROGRAMMING SKILLS

Python Programing Language	JavaScript Programing Language	Kotlin Programing Language
Pine Script Programing Language	Artificial Intelligence Engineering	Data Science / Data Engineering
Machine Learning Algorithms	Deep Learning	Natural Language Processing
Web scraping	Object Oriented Programming	Computer Vision
NumPy	Pandas	Matplotlib
PyTorch	OpenCV	Beautiful Soup
Spacy	SciKit Learn	Flask
Bootstrap	SQL	PostgreSQL
Docker	Docker Compose	Spark

ACADEMIC / RESEARCH SKILLS

Molecular Modeling	Practical Molecular Modeling	Energy Calculations
Gaussian / GaussView Suite	Data Analysis	Density Functional Theory
Laboratory Safety and Practice	X-Ray Diffraction	NMR Spectrometry
Principles in Material Science	Mass Spectrometry	IR Spectroscopy
Safety in the Chemical Laboratory		

ARTIFICIAL INTELLIGENCE / MACHINE LEARNING / DEEP LEARNING PROJECTS

Project Title **Document Summarizer**
Description
This model accepts a lengthy text document and summarizes it. The document can be in the form of a typed document, a copy-and-paste document, a .pdf file, a .txt file, images, or a URL link. The percentage by which the model summarizes the document is chosen by the user. This is a Deep Learning based model that uses Luhn, frequency count, and cosine similarity algorithms for the summarization. This also displays a word cloud summary image of the document. The libraries used include Pandas, Matplotlib, NLTK, Spacy, PyTorch, Flask, SQL, and SQL Alchemy.

Project Title **Toxic Comment Detection**
Description
This is a Deep Learning model that is trained to determine whether a comment or statement is toxic or belongs to other categories. The comments/statement can be classified into any of the six categories – extremely toxic, toxic, obscene, threat, insult, and identity hate. The libraries used include Pandas, Spacy, NLTK, PyTorch, etc.

Project Title **Road Lane Detection**
Description
The Road Lane Detection project is a Deep Learning model that detects the lane of an automobile in motion. The application of this project can be found in modern cars, and it is one of the main keys to auto-driving cars. The libraries used include OpenCV, NumPy, Matplotlib, PyTorch, etc.

Project Title **Cancer Detection Machine Learning Model**
Description
This is a Machine Learning model that predicts whether a type of cancer is malign or benign. This is a binary classification. The prediction of the type of cancer is based on feeding the model with several features. This was done using several ML algorithms such as RandomForestClassifier, GradientBoostingClassifier, LinearSVC, etc.

Project Title **Chatbot Deployment**

Description This is a Deep Learning model trained to interact with users on a specific topic. Chatbots are now very common, especially on websites. This model helps to address users' questions and inquiries without another person at the other end of the line. The dataset used in training the model was self-generated to address a specific task. The libraries used Spacy, NLTK, PyTorch, Flask, Numpy, etc.

Project Title **Road Traffic Congestion Prediction Model**
Description This is a Machine Learning model trained to address a time series problem. The model is able to predict whether there will be congestion on a particular road at a specific time using previous data. An example of where this model can be applied is Google maps. The libraries used include Numpy, Pandas, Matplotlib, Seaborn, SciKit Learn, etc,

Project Title **Sudoku Project**
Description The Sudoku game is one that most people enjoy. This game can sometimes be solved easily manually because of the visual representation of the digits. It is however very tricky to use an algorithm to solve it. This project is a Deep Learning algorithm that accepts a sudoku puzzle in the form of an image, solves it, and prints the solution back on the image. This project combines OpenCV for image processing, Deep Learning training for digit recognition, and other algorithms to solve the puzzle. The libraries used include NumPy, OpenCV, PyTorch, Matplotlib, Torchvision,

HONORS / AWARDS / SCHOLARSHIPS

Oct 2020 – Dec 2020 **Faculty of Science and Forestry Dissertation Scholarship**
Awarding Institution University of Eastern Finland, Finland

Sep 2018 – Aug 2019 **Fortum Foundation's Scholarship for Doctoral Students**
Awarding Institution Fortum Säätiö Foundation, Finland

Sep 2016 – Jan 2018 **International Master's Degree Program for Research Chemist Scholarship**
Awarding Institution University of Eastern Finland, Finland

LEADERSHIP POSITIONS HELD

Feb 2018 – Jan 2020	President	African Students Association, University of Eastern Finland
Feb 2017 – Jan 2018	Public Relation Officer	African Students Association, University of Eastern Finland
Sep 2012 – Aug 2014	President	Ghana National Students' Chemical Society, Ghana
Sep 2012 – Aug 2014	President	Ghana Students' Chemical Society, University of Cape Coast, Ghana

LANGUAGE SKILLS

Language	**Understanding**		**Speaking**		**Writing**
	Listening	Reading	Interaction	Production	
English	C2	C2	C2	C2	C2
Ewe (Native Language)	C2	C2	C2	C2	C2
Finnish	A1	A1	A1	A1	A1
A1 and **A2**: Basic User, **B1** and **B2**: Independent User, **C1** and **C2**: Proficient User					

SCIENTIFIC PUBLICATIONS AND DISSERTATIONS

- ✓ Peter Zorve and Mikko Linnolahti, Catalytic Reactions of Magnesium Dichloride Clusters Saturated by Titanium Tetrachloride, Molecular Catalysis, 499, (2021), 111314
- ✓ Peter Zorve and Mikko Linnolahti, Saturation of Magnesium Dichloride Crystallites by Titanium Tetrachloride, Surface Science, 699, (2020), 121627
- ✓ Peter Zorve and Mikko Linnolahti, Adsorption of Titanium Tetrachloride on Magnesium Dichloride Clusters, ACS Omega, 3, (2018), 9921
- ✓ Peter Zorve, Structures and Reactions of $TiCl_4$-Adsorbed $MgCl_2$ Crystallites in Ziegler-Natta Olefin Polymerization Catalysis, Doctoral Dissertation
- ✓ Peter Zorve, Saturation of Magnesium Dichloride Crystallites by Titanium Tetrachloride, Masters Dissertation

OTHER SCIENTIFIC RESEARCH INVOLVED IN

- ✓ Highly Efficient OLED Lighting Based on Rotating Molecules
- ✓ Amine Ligands of Light Emitting CMA-Complexes
- ✓ Two Coordinate Coinage Metal Complexes for OLEDs: Effects of Substitution on the Amide Ligand
- ✓ Effect of Methanol as a Model Internal Electron Donor on the Stability of Magnesium Dichloride Surfaces in the Heterogeneous Ziegler Natta Catalyst System: A DFT Study
- ✓ Alkylation of Titanium Tetrachloride on Magnesium Dichloride Clusters

SCIENTIFIC MANUSCRIPTS IN PROGRESS

- ✓ Comparison of the Adsorption of Aluminum Chloride ($AlCl_3$) and Titanium Tetrachloride ($TiCl_4$) on Ideal and Defective $MgCl_2$ Surfaces in the Heterogeneous Ziegler Natta Catalyst System
- ✓ Alkylation of Titanium Tetrachloride ($TiCl_4$) and Aluminum Chloride ($AlCl_3$) on Magnesium Dichloride ($MgCl_2$) in the Presence of Internal Donors (ID) and External Donors (ED)

CURRENT PROJECTS

I am currently working on two main and personal projects – Writing textbooks for lower-level and high-school students and Developing an Android App to incorporate the textbooks.

- ✓ **Textbooks for Lower Level and High School Students** – These are several of textbooks for all levels of students. Currently, I have c.a. 10 different Mathematics books with most of them either completed or almost completed. With time, I will expand and write more textbooks in other field such as Chemistry, General Science, and Computer Science. Below are the mathematics books, the number of pages, and the estimated completion statue.

No.	Book Title	Number of Pages	Statue
1	Mathematics for Junior High School – Form 1	70	100% complete
2	Mathematics for Junior High School – Form 2	60	100% complete
3	Mathematics for Junior High School – Form 3	56	100% complete
4	Past Questions and Answers for Junior High School – Form 1 – 3	200	40% complete
5	Mathematical Equations for Junior High Schools	35	50% complete
6	Mathematics for Senior High School – Form 1	384	90% complete
7	Mathematics for Senior High School – Form 2	494	80% complete
8	Mathematics for Senior High School – Form 3	128	80% complete
9	Past Questions and Answers for Senior High School – Form 1 – 3	100	80% complete
10	Mathematical Equations for Senior High Schools	35	40% complete

- ✓ **Android App for High School Students** – This is an android app that intend to contain the past questions and answers for Junior and Senior High School students. The app is still under development. I am using the Android Studio software suite, which uses the Kotlin programming language.

REFEREES CONTACT INFORMATION

Prof. Mikko Linnolahti, mikko.linnolahti@uef.fi, +358294453441, Chemistry Department, University of Eastern Finland
Prof. Mika Suvanto, mika.suvanto@uef.fi, +358294453451, Chemistry Department, University of Eastern Finland
Prof. Emer. Tapani Pakkanen, tapani.pakkanen@iki.fi, Chemistry Department, University of Eastern Finland, Finland

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