Araz Bagherzadeh Karimi

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EDUCATION

Georgia Institute of Technology — Atlanta, GA **December - 2022**
Master of Science in Electrical and Computer Engineering
GPA: 3.5/4

The University of Tehran — Tehran, Iran **December - 2020**
Master of Science in Power Systems
GPA: 3.7/4

Tabriz University — Tabriz, Iran **July - 2018**
Bachelor of Science in Electrical engineering - Power
GPA 3.9/4 (Top Student)

SKILLS

Technical:
- **Software:** Autocad, PSCAD, Powerfactory, Simulink, CYME, GAMS, Altium, COMSOL, PSPICE
- **Hardware:** PCB, FPGA, Troubleshooting, Testing
- **Coding:** Python, Javascript, Shell Scripting, Git, C++, SQL, MATLAB, HTML, CSS, PLC, Verilog
- **Design and Analyzing:** Website Development, Big Data, Machine Learning, Data Structure, Controller Desing, Power-Electronics Circuit Design, Optimization, Power System Distribution, Substation, Protection, and Overhead line Design, Power Quality Assessment, High Voltage Coordination, and Insulation Design, Power Flow, Short Circuit, Motor Starting, Black Start, and Arch Flash Analysis, Street, and Indoor Lightening Desing, Microgrids,

Presentation:
- Google Docs, Sheets, Slides, Microsoft Office, Visio, Latex

Job Qualities:
- Communication Skills, Problem-Solving, Open to New Skills, Teamwork, Self-reliance, Work Ethic, Detail-Oriented, Organized

Languages
- English, French, Persian, Turkish

EXPERIENCE

Internship

- **Tabriz Thermal Power Plant** *Tabriz, Iran* SUMMER 2017
  - Auxiliary Gas Turbine, Transformer, and Cable Specification Derived
  - Black Start Capability of Two Main Units with the Auxilary Gas Turbine Generator is Assessed via Motor Starting Study in DigSilent Power Factory
  - Prepared detailed calculations and a technical report presented to the Electrical Unit Supervisor

Contract

- **Developing a Website for ECE 3058 Course** *Georgia Institute of Technology, Atlanta, GA* SUMMER 2022
  - A framework for Updating the Course website is created using Git, MKdocs, Markdown & HTML.
  - All course material gathered from TAs and website updated
  - A manual to use Git, Mkdocs, and Shell scripting is prepared and presented to the teachers and TAs
- **Developing an Excel to CYME converter Software** SPRING 2021
  - Reverse engineering to determine relational Database logic of CYME software
  - Developing an Automatic tool to convert Excel Data into CYME Database directly using Shell Scripting
  - Writing a manual for other Engineers
- **East Azerbaijan Provance Utility Company** *Tabriz, Iran* SUMMER - FALL 2018
  - An automatic Short Circuit Assessment-based tool is developed for Distributed Generation Placement.
  - Powerfactory add-on script and User's Manual is developed and provided to the Electrical Engineers.

Laboratory

- **Energy conversion Lab** *Georgia Institute of Technology, Atlanta, GA* FALL 2021 - SPRING 2022
  - Circuit testing, debugging, and troubleshooting
  - Using instruments such as Oscilloscopes, Inverters, signal generators, Solar cells, wind turbines, and power

Research

- **Center for Distributed Energy** - *Georgia Institute of Technology, Atlanta, GA* FALL 2021 - PRESENT
  - Inverter Sizing and Storage Placement in a 100% Inverter-based Grid for short circuit requirements
  - Inverter control mode optimization and small signal stability for damping improvement
  - Power System Protection Relay Library Development
  - Inverter black start scheduling considering device protection and grid compliance
- **PEES Lab** *University of Tehran, Tehran, Iran* SPRING 2019 - FALL 2020
  - Imbalance Constrained Crossphase Quadratic OPF for Optimal Integration of EV Chargers and PV Inverters in Meshed and Radial Distribution Systems

Teaching Assistance

- **Architecture, Concurrency, and Energy in Computation** - *Georgia Tech, Atlanta, GA* SUMMER 2022
- **Energy Systems** - *Georgia Institute of Technology, Atlanta, GA* FALL 2021 - SPRING 2022
- **Digital System Design** - *Georgia Institute of Technology, Atlanta, GA* SPRING 2021
- **Electrical Circuits II** - *University of Tehran, Tehran, Iran* SPRING 2020 - FALL 2020

Volunteering

- **Official Peer Review Journal Reviewer** —
  - IEEE Transactions on Power Systems, IEEE Transactions on Power-Electronics, IEEE Transactions on Sustainable Energy, IEEE Power Engineering Letter, and Sceintica Iranica

ACADEMIC COURSES

Power System Design: Distribution Network Design - High Voltage Substations Design - Electrical Installations - Overhead Transmission Line Design - Industrial Drawing - Electric Machinery I, II, III, and Lab - Electrical Workshop - General Workshop

Power System Analysis: Digital Protection of Power Systems - Protection and Relay - Protection, Control, and Stability of Microgrids Power Quality - Power System Dynamics I - Power System Utilization - Electrical Energy System Analysis I, II, and Lab - Engineering Economics

Power-Electronics Design: Power-Electronics - Power-Electronics I - Industrial Electronics & Lab - Power-Electronics Application in Microgrid and Distribution Networks - Electronics I, II, and Lab - Electrical Circuits I, II, and Lab

Control Systems Design: Optimal Control - Nonlinear Systems - Linear Control Systems & Lab - Instrumentation - Electrical Measurements & Lab

High Voltage Design: High Voltage Technology - High Voltage Insulation and Grounding - Insulation Material and High Voltage & Lab

Data Analysis: Statistical Machine Learning - Signals and Systems - Engineering Statistics - Fundamentals of Communication Systems

Software: Computer Programming with C and MATLAB - Introduction to Database Systems (SQL)

Hardware: Digital Systems I, II & Lab with FPGA

NOTABLE COURSE PROJECTS

Database System Development for Football Management — *Intro to Database Systems*
- Relational Data Structure design and develop a system to monitor the operating condition and relationship of the football activities.
- SQL implementation, Foreign keys, Queries, views, and stored procedures

Flight Price Prediction and Feature Analysis using Machine Learning Techniques — *Statistical ML*
- Relational Data Structure design and develop a system to monitor the operating condition and relationship of the football activities.
- SQL implementation, Foreign keys, Queries, views, and stored procedures

Transformer Bushing Design — *High Voltage Engineering*
- Material Selection, Size Design, and Tolerance test Using COMSOL

Power-Electronics Circuit and Control Design and Simulation — *Several Courses*
- Inverters such as DC/DC, DC/AC single and three-Phase, Buck, Boost, and MMC were designed and simulated in SIMULINK and PLECS
- Controllers such as lead-lag, PI, PR, and Droop are designed using the MATLAB PI tool

Distributed Energy Installation in a Distribution Network — *Protection, Control, and Stability of Microgrids*
- DG placement using Powerfactory DPL, Sizing, Installation, Control Setting using Powerfactory DSL, relaying, and grid code compliance
- Detailed technical report prepared and presented

MV system total loss calculation with Load Imbalance Effect — *Power Quality Course's*
- MV distribution network is simulated in Powerfactory
- Total Loss is calculated for different load imbalance intensities using DPL (Digsilent Programing Language)

AVR, Governor, and PSS Design — *Power System Dynamics I*
- MATLAB Simulink Generator modeling
- Parameter tuning of the standard governor AVR and PSS blocks and testing the stability and damping of the output

Digital Implementation of Protection Relays with MATLAB — *Digital Protection of Power Systems*
- An improved scheme for distance protection in marginal faults proposed and tested
- Man-Morison and FFT phasor estimation methods, Overcurrent, Distance, Wavelet, Directional Overcurrent, Differential, power swing blocking, and other features coded in MATLAB
- PSCAD-generated fault waveforms

Domestic and Industrial Electrical Design — *Electrical Infrastructure*
- Calculation, Specification, Drawing of Industrial Electricity System Using Autocad
- Indoor and Street Lightening Calculation, Specification, and code compliance assessment

HV Substation Design —*HV Substation Design*
- Cable Sizing, Load Estimation, Transformer Selection, Relay Selection, and coordination in PowerFactory
- Grid Code Compliance assessment and Switchgear location design, Grounding Design
- Surge arrester design and insulation coordinator

Complete Design of a distribution system — *Instrumentation & Distribution System Design*
- Cable Sizing, Load Estimation, Transformer Selection, Relay Selection, and coordination in PowerFactory
- Grid Code Compliance assessment, Grounding Design, Monuver points, radial topology design
- Technical reports, including voltage profiles, load statistics, and planning comments, are presented

Line outage Contingency Study of an HV Network — *Electrical Measurements*
- Using DIgSILENT Powerfactory to assess line outage consequences, Providing technical comments

Building a DC motor — *Electric Machinery 1*
- Armature Winding and core selection, Building commutator, and testing

Building a Digital Voltmeter on PCB using Altium Designer — *Electrical Measurements*
- Circuit Diagram, PCB Design, Surface mount, and hole-through soldering

Autocad drawing assignments — *Autocad Drawing*
- Drafting of 2D and 3D electrical and mechanical parts in different layers

Overhead Transmission Line Design — *Overhead Transmission Line Design*
- Mechanical and Electrical Calculation, Specification, Drawing, installation guideline, grid code compliance
- Technical Report prepared and presented

Optimal Control in MATLAB — *Optimal Control*
- Maximum principle, Armijo step size, and relaxed optimal control problem examples solved in MATLAB

FPGA Implementation of logical circuits using Verilog — *Digital Systems II Lab*
- Write RTL codes for certain logical functions, Port the processor RTL design to FPGA/Emulation
- Test the RTL Designs with Cocotb