# MD AMIMUL EHSAN

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## Professional Summary

*Self-motivated and goal oriented graduate student, passionate about intelligent technologies, featured with substantial teamwork and leadership experiences, looking for opportunities focused in following key areas.*

- Python, R
- C/C++
- Matlab/Simulink
- Artificial Intelligence
- Data Analytics
- Renewable Energy
- Power Systems
- Smart Grid
- Digital Design
- Internet of Things (IoT)
- Control Engineering
- Circuit Analysis

## Education

- **MS/Electrical Engineering:** University of the District of Columbia, Washington, DC
  *Major:* Digital Systems Engineering, *GPA:* 4.0/4.0 **Expected: Dec/19**
- **BS/Electrical and Electronic Engineering:** Chittagong University of Engineering and Technology, Chittagong, Bangladesh **Jan/16**

## Professional Experience

- **PREP Intern-** National Institute of Standards and Technology, U.S. Dept. of Commerce **Jun/19 – Present**
  Smart Grid Program
  *Projects:*
  - Smart grid hardware-in-the-loop real time simulation
  - Impedance analyzer for Net-Zero-Energy home testbed
  - Cloud-sun occlusion tracking using AI, annotation and solar energy application
- **Graduate Teaching Assistant**- University of the District of Columbia **Jan/18 – Dec/19**
  Assisted students in performing lab experiments, graded reports and performances accordingly.
  *Courses Taught:*
  - Digital Integrated Circuit Design
  - Digital Systems Design & Synthesis
  - Control Systems
  - Signals & Systems
  - Electrical Circuits
  - Computer Org
- **Graduate Research Assistant**- University of the District of Columbia **May – Jun/19**
  U.S. Dept. of Defense research project on unidentified object detection using deep learning algorithms.
- **Research Fellow-** Lockheed Martin **Jan – May/19**
  Investigated of Deep Supervised and Unsupervised Learning on the Applications of Classification and Clustering. Applied CNN and RNN to classify handwritten digits and achieved state-of-the-art accuracy.
- **Lecturer-** Military Institute of Science and Technology, Bangladesh Naval Academy **Apr – Nov/19**
  Instructed lectures and labs of undergraduate level Electrical Circuits and Electronic Devices courses.
- **Trainee Engineer-** PRAN-RFL Group, Bangladesh **Dec/16 – Mar/17**
  Officer-in-charge of machine and process development at Danga Industrial Park.
- **Undergraduate Research Assistant-** Chittagong University of Engineering and Tech **Aug/14 – Jul/15**
  Conducted research in developing energy neutral home systems model using renewable energy sources for rural communities of Bangladesh. The work was then published in conferences and journal.
- **Co-Founder-** Dimik Electronics, Bangladesh **Mar/12 – Jul/15**
  Designed and implemented embedded systems and robotics projects as per client specifications.
  *Sample Projects:*
  - Electronic voting machine
  - PIC microcontroller programmer
  - Line following robot
  - Motor controller
  - Smart home systems
  - Smart energy meter

## Research

- **MS Thesis** **2018- Present**

  Bayesian Predictive Models for Dependent Wind-Penetrated Power Systems
  *Design Tools:* Python, R, Bugs
  *Related Courses:* Bayesian Statistics, Machine Learning, Deep Learning, Probability and Random Process

- **Field Programmable Gate Array** **2018**

  Designed and implemented high level synthesis and embedded systems projects
  *Hardware Exposure:* Xilinx Zedboard, Nexyx4 DDR
  *Programming Language:* C/C++, Tcl, VHDL, Verilog
  *Simulation Platform:* Vivado Design Suit
  *Related Courses:* Digital System Design, Computer Architecture, Microprocessor and Interfacing, Digital Logic
  *Sample Projects:*
  - Implemented various optimization techniques for practical understanding, such as- Inline, Pipeline, Dataflow, Array partition, Reshape, Interface
  - Instantiated AXI BRAM controller and BRAM to extend address space and run application from it
  - Created a Processor System to Filter Audio Signal

- **Digital Integrated Circuits** **2014, 19**

  Designed digital integrated circuits schematic, layout, LVS, and padframe
  *Design tools exposure:* Cadence, Mentor graphics
  *Related courses:* VLSI Technology, Advanced Digital Integrated Circuits
  *Sample Projects:*
  - Designed schematic, layout and pad frame of an inverter both in Cadence and Mentor Graphics
  - Designed full-custom VLSI design of CMOS Inverter, NAND, NOR, and XOR gates, 1-bit full adder in CMOS

- **Real-Time Simulation** **2018**

  Simulated power electronic converters, micro-grid and basic control systems in real time.
  *Hardware exposure:* OPAL-RT 5700 Hardware-in-the-loop Simulator, Arduino Uno
  *Design tools exposure:* RT-LAB, MATLAB/SIMULINK
  *Related courses:* Power Electronics, Power System Analysis, Control Systems Engineering
  *Sample Projects:*
  - Modeled and simulated detail modeling of 3-phase inverter, modeling of 3-phase grid integrated solar PV controller, and active microgrid consisting distributed generation sources

- **BS Thesis** **2015- 16**

  Modeling, analysis and simulation of microgrid for CUET campus
  *Design Tools:* MATLAB/SIMULINK
  *Related Courses:* Renewable Energy Technology, Power System Economics, Probability and Statistics

- **Publications**


[1] *Copula dependency selection for wide range of wind speed application*, TDB. [In preparation]
[2] *Wind speed dependency modeling and prediction of distant wind speed distribution,* TDB. [In preparation]
[3] *TOE-SC: A framework to forecast sun-cloud occlusion events from ground-based sky camera images for a solar energy application*, CVPR, 2020. [In preparation with NIST colleagues for]
[4] *Impedance Characterization of a Residential Net Zero Test Facility*, TBD. [In preparation with NIST colleagues]
[5] *Wind Speed Prediction from Meteorological Data*, TBD. [In Preparation]
[6] *Efficient Handwritten Digit Recognition Using Deep Learning*, TBD. [In Preparation]
[7] *A Practical Biogas Based Energy Neutral Home System for Rural Communities of Bangladesh*, Journal of Renewable and Sustainable Energy, Vol. 8 (2), Feb 2016, AIP Publishing. [DOI: 10.1063/1.4942783]
[8] *Biogas Based Chain Business: A Road to Sustainable Rural Development*, IEEE International Conference on Developments in Renewable Energy Technology (ICDRET), 2016.
[9] *Present Scenario and Future Prospect of Renewable Energy in Bangladesh*, International Conference on Physics for Sustainable Development and Technology (ICPSDT), 2015.
[10] *Feasibility and Safety Study of Nuclear Power in BD: Perspective to Rooppur Nuclear Power Plant*, National Conference on Electrical & Communication Engineering and Renewable Energy (ECERE), 2014.