

## CONTACT INFORMATION

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2008 Tulane Drive,  
Richardson, TX 75081  
USA

Phone: (214) 396-1343  
Email: [eva@cosoroaba.ro](mailto:eva@cosoroaba.ro)

## RESEARCH INTERESTS

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- Engineering education, specifically effects and improvement possibilities of project based learning in students of all levels
- Electric machine modeling, design and control methods
- Optimization algorithms and their applications in engineering
- Consumer and industry attractive renewable energy solutions

## TEACHING INTERESTS

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- Fostering critical, independent, and creative thinking in students, necessary to become successful engineers and members of society
- Employ project and team based learning to prepare students for the current job market as well as graduate level research
- Efficiently transfer electrical engineering knowledge to students, enabling them to understand state of the art research in the field
- Strengthen students technical communication skills, crucial for a successful career regardless of final field of work

## EDUCATION

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**PhD in Electrical Engineering, The University of Texas at Dallas** December 2017  
Dissertation: "Multiphysics Simulation, Analysis and Design of a Permanent Magnet Excited Liquid Metal Magnetohydrodynamic Power Generator"  
Advisor: Dr. Babak Fahimi

**Graduate Teaching Certificate, The University of Texas at Dallas** December 2016

**Bachelor of Engineering, Politehnica University of Timisoara, Romania** June 2013  
Thesis: "The Double Stator Switched Reluctance Machine: Electromagnetic Studies and Controlled Dynamics"  
Advisor: Dr. Ion Boldea

**Baccalaureate, The "Samuel von Brukenthal" High School** June 2009  
Concentration: Science

**German Language Certification, The Education Ministers Conference** May 2009

## RESEARCH EXPERIENCE

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**Graduate Research Assistant, The University of Texas at Dallas**    August 2013 - May 2015  
May 2016 - December 2016  
May 2017 - present

- Assisted in the successful completion of a three year grant provided by U.S. Department of Energy on “Double stator switched reluctance motor drive for electric traction”, by providing electromagnetic finite element analysis and a detailed comparative study on two possible machine windings
- Combined genetic algorithm with finite element analysis methods to optimize the rotor shape of switched reluctance machines as well as double stator switched reluctance machines
- Analyzed the cost sensitivity of the hydrogen reformation method of an industry partner in comparison with competitors
- Collaborated in optimizing the stability of cascaded DC-DC converters, using parasitic resistances
- Teamed up to simulate the power electronics and control needed for grid connection of a permanent magnet synchronous generator wind turbine
- Generated a numerical model of a 5 phase synchronous reluctance motor, using finite element data, to accurately represent nonlinearities
- Provided material for white papers and grant proposals on magnetohydrodynamic power generation including but not limited to: potential applications, efficiency, comparison to competitors in the thermal-to-electric energy conversion niche, multiphysics simulations
- Supported the master’s thesis study of permanent magnet influence on ferromagnetic materials, by providing guidance in data analysis and feedback, resulting in publication
- Modeled 3D printed parts for prototypes and test beds

### **Final Project: Teaching and Learning of Science and Mathematics, Graduate Course**

Fall 2015

- Studied topics including but not limited to: advanced teaching strategies, behavioral aspects of learning, efficient use of technology in the classroom, detection and prevention of bias towards students and the effects of micro messaging, student focused learning environment, and the importance of conveying a growth mindset to students.
- Applied gained knowledge about advanced teaching methods to the research project entitled: “Inquiry and accountable talk applied to graduate level homework”, which focused on the impact on and response of students to homework phrased as a research project, using various levels of guided inquiry.

### **Undergraduate Researcher, Politehnica University of Timisoara, Romania**

November 2011 - June 2013

- Planned, and conducted autonomous research
- Learned finite element modeling and applied it on the electromagnetic study of a double stator switched reluctance machine
- Developed a numerical machine model considering the multiple switching modes of the motor drive as well as nonlinearities
- Wrote a detailed capstone project report and presented research outcomes

## TEACHING EXPERIENCE

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### **Simulink Tutorial**

March 2017

- Designed and held an interactive graduate level tutorial on power electronics simulations using MATLAB/Simulink in the frame of the graduate level course “Control, Modeling and Simulation in Power Electronics”. The tutorial illustrated techniques of power electronics simulations needed for class projects and included student immediate feedback through real-time polling. Topics were prepared to address specific student interest according to a preceding survey held via eLearning.

### **Short Invited Lecture**

June 2016

- Prepared and lectured on electric drive simulations in MATLAB/Simulink in the frame of the graduate level course “Electric drives in vehicle traction applications”, at the University of Texas at Dallas. The talk focused on the efficient combined use of these engineering tools and illustrated different simulation approached with help of examples.

### **Graduate Teaching Assistant, The University of Texas at Dallas**    January 2015 - May 2016 January 2017 - May 2017

- Created homework problems and solutions for Electric Network Analysis (Undergraduate Level) and Control, Modeling and Simulation of Power Electronics (Graduate Level)
- Organized, structured, and lead extracurricular problem solving sessions as well as material review sessions for Electric Network Analysis (UG)
- Assisted students working on their degree capstone project in the Senior Design Project course (UG)
- Analyzed the needs and proposed workshop content to facilitate a successful Senior Design Project, considering input from a former students focus group
- Guided and facilitated students to complete laboratory projects for Microprocessor Systems (G), Electric Network Analysis (UG), and Electronic Circuits (UG)
- Graded homework and held office hours for several subjects such as Electric Network Analysis (UG), Nonlinear control (G), and Control, Modeling and Simulation of Power Electronics (G)
- Administered and supervised exams
- Collected assessment data for course owners

### **Volunteer, The Shoulders of Giants, Inc.**

October 2013 – present

- Supported primary school aged children of diverse background to complete experiments and follow the scientific method as part of science outreach summer programs on topics including biology, electromagnetism, and chemistry
- Explained various advanced concepts in an age appropriate and scientifically correct manner
- Created a student centered and inclusive environment

## PROFESSIONAL EXPERIENCE

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### **Intern, Intelligent Buildings, Romania**

July – August 2012

- Programmed automated, wireless actuators and sensors of light and HVAC applications
- Assisted with on-sight installation

### **Intern, Bosch Solar Energy AG, Germany**

June – October 2011

- Generated monthly departmental production reports
- Guided potential business partners through the solar cell production plant, offering detailed explanations for every process in English and German

### **Intern, Continental Automotive, Romania**

July – September 2010

- Determined the cycle times of every machine in the production line of automatic double clutch control electronics
- Observed the production process and searched for optimization possibilities to increase production

### **Tourist Guide, Lutheran Church of Cisnădie, Romania**

Mai 2006 – September 2008

- Lead visitor groups of all sizes, from various countries, through the church castle of Cisnădie and Cisnădioara, providing insight on the history and culture of the Transylvanian Saxons (a German minority living in Romania) tailoring the presented material according to the visitors interest

## PROFESSIONAL MEMBERSHIP

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### **Member of the Institute of Electrical and Electronics Engineers (IEEE)**

2014 – present

### **Member of IEEE Young Professionals**

2014 – present

### **Member of IEEE Women in Engineering**

2014 – present

### **Member of IEEE Education Society**

2016 – present

### **Member of the American Society for Engineering Education**

2017 – present

## SERVICE

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### **Journal and Conference Reviewer, IEEE (Institute of Electrical and Electronics Engineers)**

2014 – present

- Transactions on Vehicular Technology and on Energy Conversion
- Conference on Electromagnetic Field Computation, CEFC
- International Conference on Electrical Machines, ICEM
- International Electric Machines and Drives Conference, IEMDC
- Transportation Electrification Conference and Expo, ITEC
- Applied Power Electronics Conference and Exposition, APEC

**Secretary, IEEE Industry Application Society, UT Dallas Chapter** October 2013 - June 2015

- Maintained an orderly record of the societies paperwork, participated in University mandated meetings and helped organize project work and internal meetings

**Conference Volunteer, Annual Conference of the IEEE Industrial Electronics Society**

October 2014

**Conference Volunteer, International Conference on Optimization of Electrical and Electronic Equipment**

May 2012

## SOFTWARE SKILLS

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**Finite element simulation**

- FEMM
- Maxwell (Ansys)
- Comsol

**CAD software**

- CATIA
- Creo

**Programming and scripting**

- C/C++
- MATLAB

**Circuit design**

- Simulink
- Plecs
- Pspice

**Other**

- Microsoft Office
- prezi
- Poll Everywhere

## JOURNAL AND MAGAZINE PUBLICATIONS

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[1] M. Wu, J. Pacheco, E. Cosoroaba, and B. Fahimi, "Multiphysics simulation of pulsed cold plasma arc rotation for enhanced hydrogen harvesting" *International Journal of Hydrogen Energy*, accepted for publication September 2017

[2] Y. Li, L. Maharjan, E. Cosoroaba, and B. Fahimi, "Comparative study of a new coil design with traditional shielded figure-of-eight coil for transcranial magnetic stimulation," *IEEE Transactions on Magnetics*, accepted for publication September 2017

[3] E. Cosoroaba, E. Bostanci, Y. Li, and B. Fahimi, "Comparison of Winding Configurations on Double Stator Switched Reluctance Machines," *IET Electric Power Applications*, accepted for publication May 2017

[4] W. Cai, F. Yi, E. Cosoroaba, and B. Fahimi, "Stability optimization method based on virtual resistor and nonunity voltage feedback loop for cascaded DC-DC converters," *IEEE Transactions on Industry Applications*, vol. 51, issue 6, December 2015

[5] E. Cosoroaba, "Five reasons why you should attend conferences as a student," *IEEE Potentials*, vol. 34, issue 3, June 2015

[6] W. Wang, M. Luo, E. Cosoroaba, B. Fahimi, and M. Kiani, "Rotor shape investigation and optimization of double stator switched reluctance machine," *IEEE Transactions on Magnetics*, vol. 51, issue 3, March 2015

## CONFERENCE PUBLICATIONS

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- [7] Y. Li, E. Cosoroaba, and B. Fahimi, "Comparative study of a new coil design with traditional shielded figure-of-eight coil for transcranial magnetic stimulation," *Compumag*, Daejeon, Korea, June 2017
- [8] S. Jayasankar, L. Maharjan, E. Cosoroaba, E. Bostanci, and B. Fahimi, "On the proximity effects of high-energy magnets on M-19 magnetic steel core," *IEEE International Electric Machines & Drives Conference, IEMDC*, Miami, May 2017
- [9] E. Cosoroaba and B. Fahimi, "Magnetohydrodynamics in thermal to electric energy conversion," *The 17<sup>th</sup> Biennial Conference on Electromagnetic Field Computation, IEEE CEFC*, Miami, November 2016
- [10] E. Bostanci, L. Gu, E. Cosoroaba, M. Moallem, and B. Fahimi, "Performance improvement and comparison of concentrated winding segmental rotor and double stator switched reluctance machines," *The 17<sup>th</sup> Biennial Conference on Electromagnetic Field Computation, IEEE CEFC*, Miami, November 2016
- [11] E. Cosoroaba and B. Fahimi, "Temperature dependence of efficiency in renewable magnetohydrodynamic power generation systems," *IEEE Energy Conversion Congress & Expo, ECCE*, Milwaukee, September 2016
- [12] E. Cosoroaba and M. Wu, "Magnetohydrodynamic power generation – a renewable, emission free energy solution," *MMM-Intermag Joint Conference*, San Diego, January 2016
- [13] M. Wu and E. Cosoroaba, "Electromagnetic valves via volumetric energy conversion," *MMM-Intermag Joint Conference*, San Diego, January 2016
- [14] L. Gu, D. Patil, and E. Cosoroaba, "Core loss estimation of SPMSM based on field reconstruction method," *18<sup>th</sup> International Conference on Electrical Machines and Systems, ICEMS*, Thailand, October 2015
- [15] E. Cosoroaba and B. Fahimi, "Efficiency oriented design guidelines for a magnetohydrodynamic generator system," *IEEE International Electric Machines & Drives Conference, IEMDC*, Coeur d'Alene, May 2015
- [16] W. Cai, F. Yi, E. Cosoroaba, and B. Fahimi, "Stability analysis and voltage control method based on virtual resistor and proportional voltage feedback loop for cascaded DC-DC converters," *IEEE Energy Conversion Congress & Expo, ECCE*, Pittsburgh, September 2014
- [17] E. Cosoroaba, W. Wang, and B. Fahimi, "Comparative study of two winding configurations for a double stator switched reluctance machine," *21<sup>st</sup> International Conference on Electrical Machines, ICEM*, Germany, September 2014