Matheus C. Fernandes, Ph.D.

CONTACT / ABOUT

Citizenship: United States of America, Brazil

✉ matheus@fer.me

🖊 mcfernandes.com

in fer.me/in

𝕏 fer.me/tw

g fer.me/scholar

RG fer.me/rg

git fer.me/git

iD fer.me/orcid

EDUCATION

Harvard University – School of Engineering and Applied Sciences 📍 CAMBRIDGE, MASSACHUSETTS
Doctor of Philosophy (Ph.D.) in Applied Mathematics 📅 2015 – 2021
Advisor: Professor Katia Bertoldi
Thesis: Mechanical design and optimization of biologically inspired materials and technologies transformed by evolutionary rules.

Harvard University – Institute for Applied Computational Science 📍 CAMBRIDGE, MASSACHUSETTS
Masters of Science (SM) in Computational Science and Engineering 📅 2015 – 2020

Harvard University – School of Engineering and Applied Sciences 📍 CAMBRIDGE, MASSACHUSETTS
Masters of Engineering (M.Eng.) in Engineering Sciences 📅 2013 – 2015
Concentration: Mechanical Engineering and Material Science
Advisor: Professor James R. Rice
Thesis: Mechanics of subglacial hydrology under supraglacial lakes and ice stream shear margins.

Case Western Reserve University – Case School of Engineering 📍 CLEVELAND, OHIO
Bachelor of Science in Engineering (B.S.E.) 📅 2009 – 2013
Major: Mechanical Engineering; Minors: Business Management & Electrical Engineering
Advisors: Professor David H. Matthiesen and Dean Iwan J. Alexander
Thesis: Design, implementation and data analysis of wind turbine torque measurement device.

ACADEMIC RESEARCH

Harvard University – Professor Katia Bertoldi 📍 CAMBRIDGE, MASSACHUSETTS
Numerical Modeling of Mechanics on Small and Large Data 📅 Aug 2015 – June 2021
- Developed mechanical and hydrodynamic numerical model to investigate Hexactinellid Sponge structure for optimal arrangement of truss systems and vortex dissipation.
- Created numerical model for investigating mechanical properties of the structural coloring formation of Beetles.
- Developed a picture-less sensing soft robotic actuator using generative parametric machine learning classifiers.

Harvard University – Professor James R. Rice 📍 CAMBRIDGE, MASSACHUSETTS
Mechanics of Subglacial Hydrology 📅 May 2013 – Aug 2015
- Developed Finite Element model to analyze Röthlisberger Channel fully incised in ice stream shear margin.
- Created Finite Element model to analyze power law creep rheology of ice under hydrostatic pressure.

Case Western Reserve University – Professor David Matthiesen 📍 CLEVELAND, OHIO
Wind-turbine Mechanics and Wind-flow Assessment 📅 May 2012 – Aug 2012
- Analyzed and constructed a wind flow model of campus to investigate effects of buildings surrounding university wind turbine developing expertise in finite element development and analysis.
- Established a testing procedure to validate Computational Fluid Dynamics model against physical data.

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EMPLOYMENT EXPERIENCE

Fidelity Investments ⚲ MERRIMACK, NEW HAMPSHIRE
Fixed Income Quantitative Analyst 📅 *Feb 2023 – Present*

Fidelity Investments ⚲ BOSTON, MASSACHUSETTS
Senior Manager, Data Science – Asset Management AI Center of Excellence 📅 *Aug 2021 – Feb 2023*
- Implemented full end-to-end pipeline for prediction of future trading prices of municipal bond market using MSRB, RUNZ, and Fidelity internal data. Model performance beats equivalent commercial product by TradeWeb in all money market elligible categories and ouput is actively used by municipal money market desk.
- Led development of liquidity cost model for corporate credit markets using TRACE data and compared with Barclays LCS and Bloomberg LQA. Model closely matched aggregate predictions made by LCS and served as direct input in pilot funds.
- Developed automatic retraining and peformance evaluation pipeline through a directed acyclic graph (DAG) approach.

RESE Inc. ⚲ BOSTON, MASSACHUSETTS
Co-founder 📅 *Jan 2020 – Jan 2023*
- Developed AI algorithm to value properties based on similarity in MLS listings.
- Designed process for syndicatign real estate assets into groups of investors.
- Programmed scraping algorithm to obtain local investments information from Redit and municipality websites.

Corning Incorporated ⚲ CORNING, NEW YORK
Science and Technology Division (Sullivan Park) – Internship 📅 *May 2016 – Aug 2016*
- Optimized glass tubing process using Finite Pointset Method for Corning Pharmaceutical Technologies.
- Developed experimental setup for mechanical characterization of wet ceramic substrate composition.
- Generated application for post-processing simulation data that seeks defects during glass tube fabrication.

COMSOL Multiphysics Inc. ⚲ BURLINGTON, MASSACHUSETTS
Business Development Engineering – Internship 📅 *May 2013 – Aug 2013*
- Modeled multiphysics interactions of dynamic systems and controls using finite element analysis.
- Created content and wrote articles for company blog.
- Developed tutorials and application for unexperienced users of the software.
- Interacted with customers to develop a work-flow methodology using COMSOL to match their particular application.

PTTech ⚲ SHARON CENTER, OHIO
Electrical Engineering Designer – Co-op 📅 *Aug 2012 – Dec 2012*
- Designed and implemented an electronic circuit system to read torques on wind turbine shafts.

Bayer Material Science Corporation ⚲ PITTSBURGH, PENNSYLVANIA
Mechanical/ Electrical Engineering – Internship 📅 *May 2011 – Aug 2011*
- Solved problems and inefficiencies in plant's piping system using a piping and instrumentation diagram analysis.
- Designed bases for extruders to serve as stabilizers to reduce effect of vibrations on the machinery.
- Programmed PLCs and designed a system to distribute power to new electric piping valves.

Bayer Material Science Corporation ⚲ HEBRON, OHIO
Quality Control Lab Systems Developer – Internship 📅 *May 2010 – Aug 2010*
- Performed quality control on polycarbonate pellets using Microsoft Excel with Visual Basic Macros to develop a SPC chart system.
- Developed Python software to schedule preventative maintenance of factory's machinery and to track plant downtime.

Granville Exempted Village School District ⚲ GRANVILLE, OHIO
School District IT Specialist – Full-Time Employment 📅 *May 2008 – Aug 2009*
- Maintained district website and implemented new functionalities (e.g. Flash animations).
- Migrated old MS Access applications into PHP/JavaScript version.
- Established and administered a synchronized network with a master cluster server and multiple shared thin clients.

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- Improved the wireless coverage by installing secure access points within the district schools.

NASA Johnson Space Center (Sonny Carter Training Facility)
Pneumatics Control Code Developer – Internship

⚲ HOUSTON, TEXAS
🗓 *May 2006 – Aug 2007*

- Programmed pneumatics of an electro-mechanical robot, which served to simulate a robotic space craft in a large pool.
- Programmed multiple synchronized pneumatics to achieve certain task; such as move freely in a 180 degree motion and lock in place when arm is not moving.
- Connected pneumatics with infrared sensors and pressure gages, in order to autonomously clutch an object into place.

TEACHING EXPERIENCE

Engineering Sciences 128 (Professor Katia Bertoldi) – Teaching Fellow
Computational Solid and Structural Mechanics

⚲ Harvard University
🗓 *Spring 2019*

- Introduction to computational techniques for the simulation of a large variety of engineered systems.
- Course provides an introduction to finite element methods for analysis of steady-state and transient problems in solid, structural, fluid mechanics, and heat transfer.

Engineering Sciences 120 (Professor Joost Vlassak) – Teaching Fellow
Introduction to Mechanics of Solids

⚲ Harvard University
🗓 *Spring 2016 & Spring 2018*

- A first course in the mechanical sciences introducing elements of continuum mechanics and material sciences.
- Covering statics, equations of motions, statically indeterminate problems and advanced mechanics of materials.

Applied Mathematics 105 (Professor Michael Brenner) – Teaching Fellow
Ordinary and Partial Differential Equations

⚲ Harvard University
🗓 *Spring 2015*

- Applied Mathematics course intended for advanced undergraduates and graduate students.
- Requirement for undergraduates concentrating in certain engineering fields and applied mathematics.

Physics I&II/ Calculus I&II – Peer Tutor
Introductory Levels of Physics and Calculus for Engineers

⚲ Case Western Reserve University
🗓 *Jan 2011 – May 2012*

- Peer and group tutoring for undergraduates studying Engineering.
- Tutoring in Newtonian mechanics and electromagnetic physics.
- Tutoring in introduction to calculus, multi-variable calculus and series expansions.

PUBLICATIONS / PRESENTATIONS

Peer Reviewed Journals

[J11] Antonio Elia Forte, Paul Z. Hanakata, Lishuai Jin, Emilia Zari, Ahmad Zareei, **Matheus C. Fernandes**, Laura Sumner, Jonathan Alvarez, Katia Bertoldi. Inverse design of inflatable soft membranes through machine learning. *Advanced Functional Materials*,2022. ***doi:10.1002/adfm.202111610*** [**PDF**]

[J10] **Matheus C. Fernandes**, Saurabh Mhatre, Antonio E. Forte, Bing Zhao, Olga Mesa, James C. Weaver, Martin Bechthold, Katia Bertoldi. Surface texture modulation via buckling in porous inclined mechanical metamaterials. *Extreme Mechanics Letters*, 2022. ***doi:10.1016/j.eml.2021.101549*** [**PDF**][**COVER**]

[J9] **Matheus C. Fernandes**, Mehdi Saadat, Patrick Cauchy-Dubois, Chikara Inamura, Ted Sirota, Garrett Milliron, Hossein Haj-Hariri, Katia Bertoldi, James C. Weaver. Mechanical and hydrodynamic analyses of helical strake-like ridges in a glass sponge. *Journal of the Royal Society Interface*, 2021. ***doi:10.1098/rsif.2021.0559*** [**PDF**]

[J8] Zian Jia, **Matheus C. Fernandes**, Zhifei Deng, Ting Yang, Qiuting Zhang, Alfie Lethbridge, Jie Yin, Jae-Hwang Lee, Lin Han, James C. Weaver, Katia Bertoldi, Joanna Aizenberg, Mathias Kolle, Pete Vukusic, Ling Li. Microstructural design for mechanical-optical multifunctionality in the exoskeleton of the flower beetle Torynorrhina flammea. *Proceedings of the National Academy of Sciences*, 2021. ***doi:10.1073/pnas.2101017118*** [**PDF**]

[J7] **Matheus C. Fernandes**, Joanna Aizenberg, James C. Weaver, Katia Bertoldi. Mechanically Robust Lattices Inspired By Deep-Sea Glass Sponges. *Nature Materials*, 2020. ***doi:10.1038/s41563-020-0798-1*** [**PDF**]

[J6] Lara Tomholt, Olga Geletina, Jack Alvarenga, Anna V. Shneidman, James C. Weaver, **Matheus C.Fernandes**, Santiago A. Mota, Martin Bechthold, Joanna Aizenberg. Tunable infrared transmission for energy efficient pneumatic building façades. *Energy and Buildings*, 2020. *doi:10.1016/j.enbuild.2020.110377* [**PDF**]

[J5] Lara Tomholt, Larry J. Friesen, Daniel Berdichevsky, **Matheus C. Fernandes**, Christoph Pierre, Robert J. Wood, James C. Weaver. The structural origins of brittle star arm kinematics: An integrated tomographic, additive manufacturing, and parametric modeling-based approach. *Journal of Structural Biology*, 2020. *doi:10.1016/j.jsb.2020.107481* [**PDF**]

[J4] Sophie C. Hofferberth, Mossab Y. Saeed, Lara Tomholt, **Matheus C. Fernandes**, Christopher J. Payne, Karl Price, Gerald R. Marx, Jesse J. Esch, David W. Brown, Jonathan Brown, Peter E. Hammer, Richard W. Bianco, James C. Weaver, Elazer R. Edelman, Pedro J. del Nido.A geometrically adaptable heart valve replacement. *Science Translational Medicine*, 2020. *doi:10.1126/scitranslmed.aay4006* [**PDF**][**COVER**]

[J3] Pai Wang, Yue Zheng, **Matheus C. Fernandes**, Yushen Sun, Kai Xu, Sijie Sun, Sung Hoon Kang, Vincent Tournat, Katia Bertoldi. Harnessing Geometric Frustration to Form Band Gaps in Acoustic Networks. *Physical Review Letters*, 2017. *doi:10.1103/PhysRevLett.118.084302*. [**PDF**]

[J2] Colin R. Meyer, **Matheus C. Fernandes**, Timothy T. Creyts, James R. Rice. Effects of Ice Deformation on Röthlisberger Channels and Implications for Transitions in Subglacial Hydrology. *Journal of Glaciology*, 2016. *doi:10.1017/jog.2016.65*. [**PDF**]

[J1] James R. Rice, Victor C. Tsai, **Matheus C. Fernandes**, John D. Platt. Time Scale for Rapid Draining of a Surficial Lake into the Greenland Ice Sheet. *Journal of Applied Mechanics*, 2015. *doi:10.1115/1.4030325*. [**PDF**]

Invited Talks

[I4] **Matheus C. Fernandes**, Saurabh Mhatre, Olga Mesa, Katia Bertoldi, Martin Bechthold. Porous Inclined Auxetic Structural Material. *Thresholds: Design and Science*, Harvard Graduate School of Design, Cambridge MA, March 2020. [**LINK**]

[I3] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi. Glass Sponges: An Inspiration for Better Bridges and Buildings. *The Harvard Yard Society*, New York NY, November 2019. [**LINK**]

[I2] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi. Glass Sponges: An Inspiration for Better Bridges and Buildings. *Harvard Global Advisory Council*, Boston MA, October 2019. [**LINK**]

[I1] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi. Glass Sponges: An Inspiration for Better Bridges and Buildings. *The Harvard Horizons Symposium*, Cambridge MA, April 2019. [**VIDEO**]

Conference Talks

[T6] **Matheus C. Fernandes**, Saurabh Mhatre, Olga Mesa, Katia Bertoldi, Martin Bechthold. Porous Inclined Auxetic Structural Material. *American Physical Society (APS) March Meeting*, Denver CO, March 2020. [**VIDEO**]

[T5] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi. Harnessing Design Principles from Glass Sponges for Structurally Robust Lattices. *American Physical Society (APS) March Meeting*, Boston MA, March 2019.

[T4] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi. Harnessing Design Principles from Glass Sponges for Structurally Robust Lattices. *Materials Research Society (MRS) Fall Meeting & Exhibit*, Boston MA, November 2018.

[T3] **Matheus C. Fernandes**, James R. Rice, Victor C. Tsai, John D. Platt.Time Scale for Rapid Drainage of a Surficial Lake into the Greenland Ice Sheet. *NEGEM*, Woods Hole MA, April 2015. [**PDF**] [**LINK**]

[T2] **Matheus C. Fernandes**, Colin R. Meyer, Thibaut Perol, James R. Rice. Röthlisberger Channel Model in Ice Stream Shear Margins and Mountain Glaciers Accounting for Anti-plan Shear Loading and Undeforming Bed. *2015 IGS Symposium on Ice Sheet Hydrology*, Höfn in Hornafjörður Iceland, June 2015. [**PDF**] [**LINK**]

[T1] **Matheus C. Fernandes**, James R. Rice, Victor C. Tsai, John D. Platt. Time Scale for Rapid Draining of a Supraglacial Lake into the Greenland Ice Sheet. *NEGM*, Woods Hole MA, April 2015. [**PDF**] [**ABSTRACT**]

Patents

[E1] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi - equal contribution inventors. Design Principles for production of stronger lattices and beam structures. United States Patent - US 3,597,875 filed January 10 2019. *Harvard University Office of Technology Development*. [**PDF**] [**LINK**]

Conference Posters

[P5] **Matheus C. Fernandes**, James C. Weaver, Katia Bertoldi. Harnessing Design Principles from Glass Sponges for the Production of Structurally Robust Lattices. *Wyss Institute Retreat*, Boston MA, November 2018. [**PDF**]

[P4] **Matheus C. Fernandes**, Andrew Gross, Nikolaos Vasios, Katia Bertoldi. Soft Robot Gripper with Camera-less Object Classification using Machine Learning. *New England Mechanics Workshop 2018*, Providence RI, September 2018. [**PDF**]

[P3] **Matheus C. Fernandes**, Andrew Gross, Nikolaos Vasios, Katia Bertoldi. Soft Robot Gripper with Camera-less Object Classification using Machine Learning. *ASME - International Mechanical Engineering Conference & Exposition (IMECE)*, Tampa FL, November 2017. [**PDF**] [**ABSTRACT**]

[P2] **Matheus C. Fernandes**, Colin R. Meyer, James R. Rice. Röthlisberger Channel Model with Anti-Plane Shear Loading Superposed on In-plane Compression. *American Geophysical Union Fall Meeting Conference*, San Francisco CA, December 2014. [**PDF**] [**ABSTRACT**]

[P1] **Matheus C. Fernandes**, David H. Matthiesen. Wind Flow Model of Area Surrounding Wind Turbine. *2012 COMSOL Conference in Boston*, Newton MA, October 2012. [**PDF**]

Conference Proceedings

[C1] **Matheus C. Fernandes**, David H. Matthiesen. Wind Flow Model of Area Surrounding the Case Western Reserve University Wind Turbine. *Proceedings of the 2012 COMSOL Conference in Boston*. [**PDF**]

Thesis/Dissertations

[H3] **Matheus C. Fernandes**. Mechanics of Biologically Inspired Structures and Flexible Mechanical Metamaterials. *Harvard University Archives*, Ph.D. Dissertation, Cambridge MA, June 2021. [**PDF**]

[H2] **Matheus C. Fernandes**. Mechanics of Subglacial Hydrology under Supraglacial Lakes and Ice Stream Shear Margins. *Harvard University Archives*, Masters of Engineering Thesis, Cambridge MA, May 2015. [**PDF**]

[H1] **Matheus C. Fernandes**. Design and Implementation of Wind Turbine Torque Measurement Device. *Case Western Reserve University Archives*, Bachelor of Science in Engineering Thesis, Cleveland OH, Dec. 2012.

Press Recognition

[R10] *Unexplored dimensions of porous metamaterials.* Harvard School of Engineering and Applied Sciences News. March 17, 2022. Written by Leah Burrows. [**LINK**][**VIDEO**]

[R9] *From Sea-Sponge to Skyscraper: Bioinspired Engineering.* Science for the Public. November 16, 2020. WGBH Forum Network a NPR Station Boston, MA. [**LINK**][**VIDEO**]

[R8] *Marine sponges inspire the next generation of skyscrapers and bridges.* Harvard School of Engineering and Applied Sciences News. September 21, 2020. Written by Leah Burrows. [**LINK**]

[R7] *Applied math Ph.D. candidate takes a deep dive into bio-inspired research.* Harvard School of Engineering and Applied Sciences Student and Alumni News. April 3, 2019. Written by Adam Zewe. [**LINK**]

[R6] *Designed by Nature.* Harvard University Graduate School of Arts and Sciences. March 22, 2019. Written by Fernanda Ferreira. [**LINK**]

[R5] *Designed by Nature.* Harvard University Graduate School of Arts and Sciences April Bulletin. April 2019. [**PDF**]

[R4] *Bio-Inspired Principles Learned from Glass Sea Sponges for Engineering Stronger Structures.* Harvard Horizons Profiles. February 2019. [**LINK**]

[R3] *Inertial Focusing, a Counterintuitive Approach to Concentrate Cells.* COMSOL Blog. August 2013. [**LINK**]

[R2] *Using a Microfluidic Valve to Separate Charged Particles.* COMSOL Blog. July 2013. [**LINK**]

[R1] *Wind Turbines in Urban Settings a Reasonable Idea.* COMSOL Blog. January 2013. [**LINK**]

Peer Review Referee Nominations

[N2] *Pure and Applied Geophysics*, a Springer Journal: 1 Book Review

[N1] *Extreme Mechanics Letters* (EML), an Elsevier Journal: 2 Article Reviews

NATIONAL AND INTERNAL GRADUATE FELLOWSHIPS

- National Science Foundation Graduate Research Fellowship – Fall 2015

- The National Graduate Engineering Minority Consortium Fellowship – Fall 2016 [**CERT**]

- Corning Incorporated Fellow, Corning NY – Summer 2016

- Harvard Graduate School of Arts and Sciences Graduate Prize Fellowship – Fall 2015

- Harvard School of Engineering and Applied Sciences Blue Hills Hydrology Fellowship – Fall 2013

AWARDS / HONORS

- 2019 Harvard Bok Center Certificate of Distinction in Teaching Award – Spring ENGSCI 128

- 2019 Harvard Horizons Scholar – Presented by the Office of the Harvard GSAS Dean [**CERT**]

- 2018 Harvard Bok Center Certificate of Distinction in Teaching Award – Spring ENGSCI 120

- 2017 International Mechanical Engineering Congress & Exposition Student Presenter Travel Award Recipient

- 2016 Harvard Bok Center Certificate of Distinction in Teaching Award – Spring ENGSCI 120

- 2015 Harvard Bok Center Certificate of Distinction in Teaching Award – Spring APMTH 105

- 2015 Harvard University Graduate School of Arts and Sciences Commencement Marshal

- 2013 Stephanie Tubbs-Jones Underrepresented Minority Academic Excellence Award (CWRU)

- 2013 University President's Civic Engagement Scholar Award Recipient (CWRU)

- 2012 COMSOL Boston Conference Popular Choice Best Poster of the Year Award Recipient

- 2012 Summer Undergraduate Research in Energy and Sustainability (SURES) Funding Recipient

- 2012 Support of Undergraduate Research & Creative Endeavors (SOURCE) Intersections/Symposium Best Poster Award (CWRU)

- 2011 Two year Gomez Endowment Merit Based Scholarship (CWRU)

- 2010 Undergraduate Emerging Leaders Program (CWRU)

- 2010 Dr. Dorothy Pijan Leader of the Year Award – Nominated by faculty and peers (CWRU)

- 2009 Merit-Based 4-Year Provost Scholarship Recipient – Honor awarded to top 5 % of applicants (CWRU)

- Dean's High Honors (Spring 2012), Dean's Honors List (Fall 2009, Spring 2010, Fall 2012, Spring 2013) (CWRU)

CERTIFICATIONS / LICENSES

- 2021 SQL for Data Science Certification - Coursera [**CERT**]

- 2020 Amazon Web Services (AWS) Machine Learning Certification - Coursera [**CERT**]

- 2020 Mini-MBA Harvard Business School - Harvard GSAS Business Club [**CERT**]

- 2020 HeartSaver First Aid CPR AED by American Heard Association Certification [**CERT**]

- 2020 Coursera AWS Machine Learning Certification [**CERT**] [**VALIDATION**]

- 2020 edX HarvardX STAT110X - Introduction to Probability [**CERT**] [**VALIDATION**]

- 2019 Abaqus®(Dassault Systèmes, SIMULIA®) Structural Analysis Associate Certification [**CERT**] [**VALIDATION**]

- 2018 Certification of Achievement (RED): The Physics Machine Shop of Harvard University

- 2013 Engineer-In-Training (EIT), Ohio State Board of Professional Engineers and Surveyors [**PDF**][**CERT**] [**VALIDATION**]

- Wind Turbine Technology Climbing and Safety at Heights Certification, Lorain County Community College, Elyria OH – July 2012 [**CERT**]

- Responsible Conduct of Research Certified – May 2012

- PLC Training Certification, Career and Technology Education Center of Licking County (CTEC), Newark OH – July 2011 [**CERT**]

- Lean Six Sigma Yellow Belt Certification – June 2010

MEMBERSHIP / LEADERSHIP / COMMUNITY SERVICE EXPERIENCE

- The Summit House Board of Trustees: 2019 - Present (Voting Board Member); 2018 (Associate Board Member)

- Society of Harvard Horizons Scholars: 2019 - Present

- American Physical Society (APS) Member: 2018 - Present

- Materials Research Society (MRS) Member: 2018 - Present

- Harvard GSAS Committee on Graduate Education: 2018 - 2019

- Harvard FAS Faculty Meeting Elected Graduate Student Representative: 2018 - 2019

- Harvard Graduate School Leadership Institute – Spring 2016 (Cohort 9)

- Cambridge Fellows Member of Harvard University: 2016 - Present

- Harvard Graduate School of Arts and Sciences Graduate Student Council (GSC): 2015 - 2019

- Harvard Arnold Arboretum Park Conservancy Volunteer: 2014 - 2017

- Harvard SEAS-Cambridge Public Schools Engineering and Science Showcase Volunteer: 2015 - 2019

- NEW.Mech Conference at Harvard University and MIT Host: 2016, 2017

- Harvard University Housing - Community Advisor for Peabody Terrace: 2016 - 2017

- Harvard School of Engineering and Applied Sciences Graduate Council (GC): 2015 - 2016

- Harvard University Sustainable Community Leader: 2014 - 2015

- Emerging Leaders Program (ELP) of Case Western Reserve University: 2009 - 2010

- Undergraduate Student Ambassador (student representative for University President and philanthropic Alumni visiting campus): 2010-2012 Case Alumni Association

- Undergraduate Student Government: 2010-2011 – Vice President/ Head of Engineering Caucus; 2009-2010 – Head of First Year Caucus

- Residence Hall Association: 2009-2010 – Vice President (Juniper Residential College)

- Cleveland Public School District/Church of the Covenant K-12 Tutor in Mathematics and Physical Sciences: 2011 - 2013

- GED Tutoring for underprivileged minority women at Greater Cleveland YWCA: 2010 - 2011

- Conservancy for Cuyahoga Valley National Park Volunteer: Spring 2013

- Engineers Without Borders: Local Cleveland Chapter Member: 2012 - 2013

- American Society of Mechanical Engineers (ASME) Student Member: 2012 - Present

- Institute of Electrical and Electronics Engineers (IEEE) Student Member: 2012 - Present

MENTORING / ADVISING

Bing Zhao (Visiting Postdoctoral Fellow) – Shanghai Jiao Tong University, China   📅 *Jan 2020 – Aug 2020*
Fabrication and Data Collection of Inclined Metamaterial Structures

Kevin Li (Visiting High School Student) – Brookline High School (MA)   📅 *Jun 2019 – Sep 2019*
Machine Learning Object Generation and Data Collection

Patrick Cauchy (Visiting Masters Student) – U. of Technology of Compiègne (France)   📅 *Sep 2018 – Feb 2019*
CAD Creation and Numerical Modeling of Euplectella Sp. Cylindrical Geometry)

Brad Eisenschenk (Visiting Undergraduate Student) – U. of Minnesota   📅 *May 2017 – Sep 2017*
Actuator circuit development, sensor calibration and sensor communication.

SKILLS

Fluent Languages (Read, Write, Speak): English, Portuguese, German, and Spanish

Coding Proficiencies: Allen-Bradley®PLC Programming, Amazon AWS®Interface, Apache Spark, C, Cython, GitHub, HTML, Java, JavaScript, Julia, LaTeX 2$_\varepsilon$, Mathematica®, MATLAB®, Minitab®, NoGrid®, OpenCL (GPU Programing), PHP, Python, Tableau®, Verilog®(HDL Software), Visual Basic

Machine Learning and Data Science Platform Experience: H2O®, Keras, R (R-Studio), Scikit Learn, SQL, Snowflake, Stan

Finite Element Analysis Experience: Abaqus®, Ansys®, Ansys ®CFX (CFD), COMSOL Multiphysics®(Femlab), MeltFlow®

Selected class projects can be found here: fer.me/down

Please find latest version of this CV at: fer.me/cv

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