

# Davi Soares

Address: 1845 Fairmount St., Wallace Hall, room 319  
Wichita, Kansas 67260

Email : davi.soares@wichita.edu

Telephone: +1 (316) 978-6350

## EDUCATION

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- **Kansas State University** Manhattan, Kansas, USA  
*Ph.D. in Mechanical Engineering* January 2019 – August 2021
- **State University of Campinas** Campinas, Sao Paulo, Brazil  
*Master of Science in Electrical Engineering* August 2017 – December 2018
- **Federal University of Itajuba** Itajuba, Minas Gerais, Brazil  
*Bachelor of Science in Electrical Engineering* March 2010 – December 2015

## PROFESSIONAL EXPERIENCE

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- **Wichita State University** Wichita, Kansas, USA  
*Tenure-track assistant professor in the electrical and computer engineering department* August 2023 - present
- **Freudenberg e-Power Systems** Auburn Hills, Michigan, USA  
*Cell modeling engineer* August 2021 - July 2023
- **Kansas State University** Manhattan, Kansas, USA  
*Graduate research assistant* January 2019 - July 2021
- **State University of Campinas** Campinas, São Paulo, Brazil  
*Graduate research assistant* August 2017 - December 2018
- **JS Insulators Industry** Mogi-Mirim, São Paulo, Brazil  
*Technical commercial analyst* January 2016 - August 2017
- **High Voltage Laboratory at Federal University of Itajuba** Itajuba, Minas Gerais, Brazil  
*Undergraduate student researcher* May 2014 - December 2015
- **General Electric Transportation** Erie, Pennsylvania, USA  
*3P/New Product Introduction intern* May 2013 - August 2013

## GRANTS

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- **Kansas NASA EPSCoR:** Project titled “*Investigation of ceramic anodes and ionic liquids to enhance thermal stability and energy density in lithium-ion batteries for aerospace systems*”, \$28,950, P.I. share: 100%.
- **National Institute for Aviation Research (NIAR):** Technical consultancy for a battery-powered aircraft project, \$6,330,581, P.I. share: 0.4%.
- **Kansas NSF EPSCoR:** Project titled “*Physics-informed machine learning model for assessment of state of health of lithium-ion batteries used in resilient infrastructure applications*”, \$67,652, P.I. share: 100%.
- **Multidisciplinary Research Projects (MURPA):** Project titled “*Mitigating failures in battery-powered flights: battery management through safety-critical control*”, \$7,498, PIs hare: 50%.
- **Tim & Laura Unruh faculty support in engineering fund:** Grant awarded to “*advance the work on understanding the longevity of rechargeable batteries*”, \$1,500, P.I. share: 100%.

## HONORS & AWARDS

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- **State University of Campinas (UNICAMP) Outstanding Alumni Award:** 2025.
- **Wichita State University Young Faculty Risk-taker Award:** 2025.
- **Kansas NSF EPSCoR First Award:** 2023-2025.
- **Naim Z. and Beverly J. Azer mechanical engineering graduate scholarship:** 2020.
- **São Paulo Research Foundation (FAPESP) graduate scholarship,** 2017
- **Japan Student Services Organization (JASSO) scholarship,** 2018.
- **Master of science scholarship:** Sponsored by *Coordination for the Improvement of Higher Education Personnel*, 2017-2018.

- **Young talent attraction scholarship:** Sponsored by *Coordination for the Improvement of Higher Education Personnel*, 2014.
- **Science without borders scholarship:** Sponsored by *Institute of International Education*, 2012.
- **Medal of Honor:** Awarded the Medal of Honor by Brazilian Army due to discipline during Military Service.

#### PUBLICATIONS (BOLD FONT INDICATES A STUDENT AUTHOR)

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#### PEER-REVIEWED JOURNAL ARTICLES

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- [1] M. Z. Hossain and D. M. Soares, "Electrochemical activity of NbSe<sub>2</sub> in sodium and potassium-ion batteries: a temperature-dependent study," *Future Batteries*, p. 100131, 2025.
- [2] G. M. Lustosa, W. A. Bizzo, L. V. de Souza, G. Biasotto, L. A. Perazolli, K. C. Pereira, C. C. Silva, D. M. Soares, and T. Mazon, "Boosting properties of the biochar composite by an in situ growth of nickel nanospheres through an one-step synthesis: applications in supercapacitors," *Materials Research Bulletin*, p. 113885, 2025.
- [3] C. Almeida, P. Jackson, R. Vicentini, **E. L. Pereira**, E. Santos, L. M. Da Silva, D. M. Soares, and H. Zanin, "Charge and energy storage properties of NiO-AC composites in organic electrolyte using operando raman and distributed capacitance analyses in the time domain," *Next Energy*, vol. 9, p. 100461, 2025.
- [4] **E. L. Pereira**, **D. Ogun**, and D. M. Soares, "Comprehensive real-time insights for state of health prediction: A comprehensive framework for online state of health assessment in commercial lithium-ion batteries," *ChemElectroChem*, p. 2400708, 2025.
- [5] D. M. Soares and G. Singh, "Weyl semimetal orthorhombic Td-WTe<sub>2</sub> as an electrode material for sodium- and potassium-ion batteries," *Nanotechnology*, vol. 32, p. 505402, sep 2021.
- [6] M. Alexandreli, C. B. Brocchi, D. M. Soares, W. G. Nunes, B. G. Freitas, F. E. de Oliveira, L. E. C. A. Schiavo, A. C. Peterlevitz, L. M. da Silva, and H. Zanin, "Pseudocapacitive behaviour of iron oxides supported on carbon nanofibers as a composite electrode material for aqueous-based supercapacitors," *Journal of Energy Storage*, vol. 42, p. 103052, 2021.
- [7] B. Freitas, W. G. Nunes, D. M. Soares, F. C. Rufino, C. M. Moreira, L. M. Da Silva, and H. Zanin, "Robust, flexible, freestanding and high surface area activated carbon and multi-walled carbon nanotubes composite material with outstanding electrode properties for aqueous-based supercapacitors," *Materials Advances*, vol. 2, pp. 4264–4276, 2021.
- [8] D. M. Soares, Z. Ren, S. B. Mujib, S. Mukherjee, C. G. Martins Real, M. Anstine, H. Zanin, and G. Singh, "Additive manufacturing of electrochemical energy storage systems electrodes," *Advanced Energy and Sustainability Research*, vol. 2, no. 5, p. 2000111, 2021.
- [9] S. B. Mujib, Z. Ren, S. Mukherjee, D. M. Soares, and G. Singh, "Design, characterization, and application of elemental 2D materials for electrochemical energy storage, sensing, and catalysis," *Materials Advances*, vol. 1, pp. 2562–2591, 2020.
- [10] D. M. Soares and G. Singh, "Superior electrochemical performance of layered WTe<sub>2</sub> as potassium-ion battery electrode," *Nanotechnology*, vol. 31, p. 455406, aug 2020.
- [11] D. M. Soares, S. Mukherjee, and G. Singh, "TMDs beyond MoS<sub>2</sub> for electrochemical energy storage," *Chemistry – A European Journal*, vol. 26, no. 29, pp. 6320–6341, 2020.
- [12] D. M. Soares and G. Singh, "SiOC functionalization of MoS<sub>2</sub> as a means to improve stability as sodium-ion battery anode," *Nanotechnology*, vol. 31, p. 145403, jan 2020.
- [13] D. M. Soares, R. Vicentini, A. C. Peterlevitz, C. B. Rodella, L. M. da Silva, and H. Zanin, "Tungsten oxide and carbide composite synthesized by hot filament chemical deposition as electrodes in aqueous-based electrochemical capacitors," *Journal of Energy Storage*, vol. 26, p. 100905, 2019.

- [14] S. Mukherjee, J. Turnley, E. Mansfield, J. Holm, D. Soares, L. David, and G. Singh, “Exfoliated transition metal dichalcogenide nanosheets for supercapacitor and sodium ion battery applications,” *Royal Society Open Science*, vol. 6, no. 8, p. 190437, 2019.
- [15] R. Vicentini, W. Nunes, B. G. Freitas, L. M. D. Silva, D. M. Soares, R. Cezar, C. B. Rodella, and H. Zanin, “Niobium pentoxide nanoparticles @ multi-walled carbon nanotubes and activated carbon composite material as electrodes for electrochemical capacitors,” *Energy Storage Materials*, vol. 22, pp. 311 – 322, 2019.
- [16] R. Vicentini, D. M. Soares, W. Nunes, B. Freitas, L. Costa, L. M. D. Silva, and H. Zanin, “Core-niobium pentoxide carbon-shell nanoparticles decorating multiwalled carbon nanotubes as electrode for electrochemical capacitors,” *Journal of Power Sources*, vol. 434, p. 226737, 2019.
- [17] S. Mukherjee, S. Bin Mujib, D. Soares, and G. Singh, “Electrode materials for high-performance sodium-ion batteries,” *Materials*, vol. 12, no. 12, 2019.
- [18] R. Vicentini, L. H. Costa, W. Nunes, O. Vilas Boas, D. M. Soares, T. A. Alves, C. Real, C. Bueno, A. C. Peterlevitz, and H. Zanin, “Direct growth of mesoporous carbon on aluminum foil for supercapacitors devices,” *Journal of Materials Science: Materials in Electronics*, vol. 29, pp. 10573–10582, Jun 2018.
- [19] D. M. Soares, S. Mendonça, E. T. Neto, and M. L. Martinez, “Electrical field on non-ceramic insulators and its relation to contact angles for constant volume droplets,” *Journal of Electrostatics*, vol. 84, pp. 97 – 105, 2016.
- [20] I. F. S. dos Santos, N. D. B. Vieira, R. M. Barros, G. L. T. Filho, D. M. Soares, and L. V. Alves, “Economic and CO<sub>2</sub> avoided emissions analysis of WWTP biogas recovery and its use in a small power plant in Brazil,” *Sustainable Energy Technologies and Assessments*, vol. 17, pp. 77 – 84, 2016.

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#### PEER-REVIEWED CONFERENCE PROCEEDINGS

- [1] **N. Aravinthan, M. Koester**, D. Alexander, M. Peterson, and D. Soares, “Enhancing hybrid battery-solar return on investment by dynamic battery pack usage and charge management,” in *IEEE 57th North American Power Symposium (NAPS)*, p. n/a, IEEE - *in press*, 2025.
- [2] **E. L. Pereira, M. Z. Hossain, D. Ogun**, and D. Soares, “Machine learning-based framework for online state of health assessment and end-of-life prediction in commercial lithium-ion batteries,” in *2025 IEEE Green Technologies Conference (GreenTech)*, pp. 108–112, IEEE, 2025.
- [3] **D. Ogun** and D. Soares, “Electric field analysis at triple-joints and localized defects on different composite insulators designs,” in *2024 IEEE Conference on Electrical Insulation and Dielectric Phenomena (CEIDP)*, pp. 1–4, IEEE, 2024.

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#### PEER-REVIEWED BOOK CHAPTERS

- [1] S. B. Mujib, S. Mukherjee, Z. Ren, D. M. Soares, C. G. M. Real, H. Zanin, and G. Singh, *Recent Advances and Trends in Al-Ion Batteries*. CRC Press, 2024.
- [2] D. M. Soares, S. Mukherjee, and G. Singh, *Transition metal dichalcogenides as active anode materials for sodium-ion batteries, Handbook of Sodium-Ion Batteries: Materials and Characterisation*. Jenny Stanford Publishing, 2023.

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#### SELECTED CONFERENCE PRESENTATIONS

- [1] **M. Zawad Hossain** and D. M. Soares, “Exploration of temperature variability effect on electrochemical performance of NbSe<sub>2</sub> electrode in sodium-ion batteries,” 247<sup>th</sup> ECS Meeting, May 2025.
- [2] **M. Zawad Hossain** and D. M. Soares, “Temperature effect on electrochemical performance of NbSe<sub>2</sub> electrode in sodium-ion batteries,” ACS Spring 2025, March 2025.

[3] **E. Pereira, D. Ogun**, and D. M. Soares, “A physics-informed machine learning framework for state-of-health assessment of lithium-ion batteries in resilient infrastructure applications,” Kansas Capitol Graduate Research Summit, March 2025.

[4] **E. Pereira, D. Ogun**, and D. M. Soares, “Online state of health assessment of lithium-ion battery using physics-informed machine learning model for resilient infrastructure applications,” ASME International Mechanical Engineering Congress and Exposition (IMECE 2024), November 2024.

[5] D. M. Soares, C. Shuck, N. Kurra, Y. Gogotsi, and G. Singh, “MXene nanosheets as alkali metal-ion battery electrodes: Initial studies,” MXenes: Ten Years Later Conference, August 2020.

INVITED PRESENTATIONS

[1] D. Soares, “Lithium-ion batteries and beyond: a comprehensive perspective on state of health assessment,” pp. 2025 IEEE Green Technologies Conference, Wichita, KS, March, 2025.

[2] D. Soares, “Lithium-ion batteries and beyond: an approach from novel materials and modeling technologies,” pp. Universidad Autonoma de Occidente, Cali – Colombia, September, 2024.

TEACHING

- **Educational activity:** Introduced a new graduate level course in Battery modeling and characterization (course number ECE 777AE: “Characterization and modeling of batteries”).

				Student evaluation (Scale 1-5, 5 = Outstanding)	
Course	Level	Year	Enrollment	Course evaluation:	Instructor evaluation:
ECE 463: Applied engineering electromagnetics	Junior	Fall 2023	22	4.10	4.36
		Fall 2024	42	4.08	4.31
		Fall 2025	35	4.33	4.50
ECE 777AE: Characterization and modeling of batteries	Grad. / senior elective	Spring 2024	7	4.57	4.52
		Spring 2025	18	4.31	4.43

SERVICE

Department service:

- **Taught and developed lectures for ECE 777AF: *Controls, Communication and Storage for Transportation Electrification*:** (Spring 2024).
- **Electrical and Computer Engineering graduate committee member:** (Fall 2023 – present).
- **Electrical and Computer Engineering senior design faculty advisor:** (Fall 2023 – present).
- **Electrical and Computer Engineering faculty advisor:** (Fall 2023 – Spring 2025).

PROFESSIONAL ACTIVITIES

- **Proposal reviewer and panelist for:** National Science Foundation (NSF) - CBET Electrochemical Systems, Department of Energy (DOE) ARPA-E.
- **Scientific editor (2025 - present):** Materials Today Communications (impact factor: 4.5).

• **Member of:** IEEE - Eta Kappa Nu, Materials Research Society (MRS), and Tau Beta Pi.

• **Committee member:**

1. Guto Garcia Santos (M.S., University of Campinas, Brazil). *Development of cathode  $\text{Na}_3\text{V}_2(\text{PO}_4)_3$  and electrochemical analysis applied to sodium-ion batteries.* July 2025.
2. Raissa Venâncio (Ph.D., University of Campinas, Brazil). *Advanced Electrolytes for High-Voltage Supercapacitors: An Integrated Electrochemical-Operando Approach.* July 2025.
3. Sonu Gangadhar Gowda (M.S. project, Asaduzzaman). *Predicting performance of heterogeneous edge-cloud systems using machine learning models.* April 2025.
4. Rama Krishna Nallapuri (M.S. project, Aravinthan). *Performance Evaluation and Energy Analysis of a Hybrid Solar-Fuel cell Source Converter for DC Microgrid Integration.* December 2024.
5. Vanderleia de Deus Mateus (M.S., University of Campinas, Brazil). August 2024.
6. Syra Kelly Mubarak Silva Oliveira (M.S., University of Campinas, Brazil). August 2024.
7. Kolade Oke (M.S., Pang). *Artificial intelligence-based distance relay behaviors for future power systems with 100% clean electricity.* July, 2024.
8. Rafael Felipe Vicentini (Ph.D., University of Campinas, Brazil). September 2023.

• **Doctoral students supervised:**

1. Eric L. Pereira (Spring 2024 - Spring 2027 (expected)). Conducting research on enhanced physics-informed machine learning models for resilient battery-powered infrastructure systems.  
Awards: (i) 2025 Outstanding Graduate Research award; (ii) second place award for Outstanding Research Poster at the NSF 2025 track-1 Adaptive & Resilient Infrastructures driven by Social Equity (ARISE) annual symposium in Garden City, KS; (iii) one of the ten graduate students from the entire university selected to present his research at the Capitol Graduate Research Summit (CGRS) in Topeka, KS.
2. Md Zawad Hossain (Summer 2024 - Fall 2027 (expected)). Conducting research on kinetics behavior and its implications on degradation mechanisms of selenide-based transition metal dichalcogenides for nonaqueous monovalent-ion battery technologies.  
Awards: (i) Dora Wallace Hodgson - Outstanding Doctoral Student award; (ii) one of the ten graduate students from the entire university selected to present his research at the Capitol Graduate Research Summit (CGRS) in Topeka, KS.

• **Journal article reviewer:**

Nature Nanotechnology	Advanced Materials Technologies
Nanoscale	Journal of Materials Chemistry A
Small Methods	Crystals
IOP Nanotechnology	Energies
Nano-Micro Letters	Molecules
RSC Advances	Scientific Reports
Journal of Alloys and Compounds	Physica E: Low-dimensional Systems and Nanostructures