

Luize Scalco de Vasconcelos

Postdoctoral Fellow - Department of Aerospace Engineering and Engineering Mechanics
University of Texas at Austin
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EDUCATION

- 2016 - 2020 **Purdue University**, West Lafayette, IN, USA
Ph.D. in Mechanical Engineering
Dissertation: *Chemo-mechanics of Li-ion batteries: In-situ and operando studies*
- 2014 - 2016 **Purdue University**, West Lafayette, IN, USA
M.S. in Mechanical Engineering
Thesis: *High-throughput mechanical characterization methods for composite electrodes and in-situ analysis of Li-ion batteries*
- 2009 - 2014 **Federal University of São João del Rei**, MG, Brazil
B.S. in Mechanical Engineering
Undergraduate thesis: *Study and optimization of the torsion beam of a twist-beam suspension via numerical simulation*
- 2012 - 2013 **University of Minnesota**, Minneapolis, MN, USA
Undergraduate exchange

RESEARCH

- 03/2021 - present **Postdoctoral Fellow**, The University of Texas at Austin
PI: Prof. Nanshu Lu
- Advanced materials and manufacturing techniques for direct-write of soft bio-integrated electronics
- 01/2015 - 12/2020 **Research Assistant**, Purdue University
Advisor: Prof. Kejie Zhao
- Chemo-mechanical processes governing the performance of energy storage materials via multi-physics modeling, statistical analysis, and *operando* nanoscale experiments
- 12/2011 - 01/2013 **Research Assistant**, Federal University of São João del Rei
Advisor: Prof. Marcio Eduardo Silveira
- Numerical analysis of the relationship between geometrical parameters, stiffness and kinematic behavior of automotive suspensions

TEACHING

- Fall 2020 **Instructor, Perry Fellow** - Basic Mechanics I, Purdue University
- Instructor evaluation: **5 out of 5**. Response rate: 91 out of 131
- Fall 2019 **Instructor, Perry Fellow** - Basic Mechanics I, Purdue University
- Instructor evaluation: **4.4 out of 5**. Response rate: 92 out of 111
- Spring 2017 **Laboratory lecturer** - Mechanical Engineering Design, Innovation and Entrepreneurship, Purdue University
- Lecturer evaluation: **4.7 out of 5**. Response rate: 38 out of 38
- Fall 2016 **Teaching assistant** - Mechanical Engineering Design, Innovation and Entrepreneurship, Purdue University

INDUSTRY

05/2013 - 08/2013 **Mechanical Engineering Intern - R&D**, DuPont Company, DE, USA

- Experiments and predictive models of the mechanical response of fiber-reinforced thermoplastics under dynamic loads via low temperature characterization with the end goal of reducing cost and lead-time of material development

AWARDS

2019, 2020 **Perry Teaching Fellowship**, School of Mechanical Engineering, Purdue University

2019 **Best Paper Award**, Battery Student Division, 235th Electrochemical Society Meeting

2019 **Conference Travel Grant**, College of Engineering, Purdue University

2018 **Estus H. and Vashti L. Magoon Award for Excellence in Teaching**, College of Engineering, Purdue University

2017 **3rd place oral presentation**, 3rd Midwest Mechanics of Materials and Structures Workshop

2014 **Brazil Mobility Program Scholarship**, Coordination for the Improvement of Higher Education Personnel (CAPES)

- Full scholarship for Master's studies in the USA

2012 **Brazil Science without Borders Program Scholarship**, Coordination for the Improvement of Higher Education Personnel (CAPES)

- Full scholarship for one-year undergraduate studies in the USA

PATENT

2019 Apparatus to measure mechanical properties of electrodes during electrochemical reactions and method of using the same. K. Zhao, **L. S. Vasconcelos**, R. Xu. US Patent 11,002,652.

SERVICE

- Journal reviewer: Experimental Mechanics, Extreme Mechanics Letters, Thin Solid Films, Mechanics of Materials, Frontiers in Mechanical Engineering, Journal of the Electrochemical Society

2021 External reviewer, MSCA-COFUND program STAR

2021 Judge, UT CARE Research Day, University of Texas at Austin, TX, USA

2020 External reviewer, Canadian Light Source (CLS)

2020 Judge, SURF Summer Symposium, Purdue University, IN, USA

2018 Symposium Assistant, Society of Experimental Mechanics Meeting, Purdue University, IN, USA

2017 Symposium Assistant, Materials Research Society Spring Meeting, Phoenix, AZ, USA

EDUCATION OUTREACH

Conducted hands-on science activities to encourage kids, especially girls, to pursue STEM fields:

07/2019, 07/2015	Engineering FYI: For Your Imagination, Women in Engineering Program
07/2015	Science and Engineering: Heat, Light and Power Event, Imagination Station Museum
11/2015	Innovation to Reality - Women in Engineering Program

JOURNAL PUBLICATIONS

Google Scholar: 200+ citations, [†]Equal contribution, *Corresponding author

1. **L. S. Vasconcelos**, R. Xu, Z. Xu, Z. Xu, J. Zhang, N. Sharma, S. Shah, J. Han, X. He, S. Hu, X. Wu, H. Sun, Y. Liu, F. Lin, Y. Cui, K. Zhao. Chemomechanics of Rechargeable Batteries: Status, Theories, and Perspectives. Proposal accepted in *Chemical reviews*. Manuscript in progress.
2. N. Sharma, **L. S. Vasconcelos**^{†*}, S. Hassan, K. Zhao*. Asynchronous-to-synchronous transition of Li reactions in solid-solution cathodes: operando optical experiments and theories. Submitted.
3. S. Hu, P. Xu, **L. S. Vasconcelos**, L. Stanciu, H. Ni*, K. Zhao*. Elastic modulus, hardness, and fracture toughness of $\text{Li}_{6.4}\text{La}_3\text{Zr}_{1.4}\text{Ta}_{0.6}\text{O}_{12}$ solid electrolyte. Submitted.
4. H. Chen, Y. Yang, D. Boyle, Y. Jeong, R. Xu, **L. S. Vasconcelos**, H. Wang, H. Wang, W. Huang, H. Li, J. Wang, H. Gu, R. Matsumoto, K. Motohashi, Y. Nakayama, Y. Cui. Free-standing ultrathin lithium metal/graphene oxide host foil with controllable thickness. *Nature Energy*, 1-9.
5. D. C. Branco, **L. S. Vasconcelos**, L. An, K. Zhao, G. J. Cheng. Ultrastrong pure aluminum structure with gradient via selective pulsed laser melting: Computation framework and experiments (2021). *Journal of Mechanics and Physics of Solids*, 104391.
6. X. Wang, **L. S. Vasconcelos**, K. Chen, K. Perera, J. Mei, K. Zhao. In-situ measurement of breathing strain and mechanical degradation in organic electrochromic polymers (2020). *ACS Applied Materials & Interfaces*. 12, 50889–50895.
7. **L. S. Vasconcelos**, R. Xu, K. Zhao. Quantitative spatiotemporal Li profiling using nanoindentation (2020). *Journal of Mechanics and Physics of Solids*, 144, 104102.
8. X. Wang, K. Chen, **L. S. Vasconcelos**, J. He, Y. Shin, J. Mei, K. Zhao (2020). Mechanical breathing in organic electrochromics. *Nature Communications*, 11(1), 1-10.
9. **L. S. Vasconcelos**, N. Sharma, R. Xu, K. Zhao (2019). In-situ nanoindentation measurement of local mechanical behavior of a Li-ion battery cathode in liquid electrolyte. *Experimental Mechanics*, 59(3), 337-347.
10. R. Xu, **L. S. Vasconcelos**, J. Shi, J. Li, K. Zhao (2018). Disintegration of meatball electrodes for $\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$ cathode materials. *Experimental Mechanics*, 58(4), 549-559.
11. **L. S. Vasconcelos**, R. Xu, K. Zhao (2017). Operando nanoindentation: a new platform to measure the mechanical properties of electrodes during electrochemical reactions. *Journal of The Electrochemical Society*, 164(14), A3840-A3847.
12. R. Xu, H. Sun, **L. S. Vasconcelos**, K. Zhao (2017). Mechanical and structural degradation of $\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$ cathode in Li-ion batteries: an experimental study.

Journal of The Electrochemical Society, 164(13), A3333-A3341.

13. **L. S. Vasconcelos**, R. Xu, J. Li, K. Zhao (2016). Grid indentation analysis of mechanical properties of composite electrodes in Li-ion batteries. *Extreme Mechanics Letters*, 9, 495-502.
14. R. Xu, **L. S. Vasconcelos**, K. Zhao (2016). Computational analysis of chemomechanical behaviors of composite electrodes in Li-ion batteries. *Journal of Materials Research*, 31(18), 2715-2727.
15. M. E. Silveira, **L. S. Vasconcelos**, A. L. Christoforo (2012). Numerical simulation of the kinematic behavior of a twist beam suspension using finite element method. *Journal of Mechanical Engineering and Automation*, 2(6), 150-158.

CONFERENCE PUBLICATIONS

1. **L. S. Vasconcelos**, M. E. Silveira, A. L. Christoforo (2012). Evaluation of the torsion beam of a twist-beam suspension by numerical simulation (No. 2012-36-0483). *SAE Technical Paper*.
2. **L. S. Vasconcelos**, Silveira M.E., Christoforo A.L., The influence of geometric non-linearity in the numerical simulation of a twist-beam suspension [in Portuguese], *In: XII Congresso Nacional de Engenharia Mecânica e Industrial (CONEMI)* - ISSN: 2446-9734, Brazil, 2012.
3. C. E. Júnior C.E., **L. S. Vasconcelos**, C. S. Mendonça, J. A. Silva, A methodology for the selection of the caster angle in off-road vehicle prototypes [in Portuguese], *In: I Congresso de Engenharias (COEN)* - ISSN: 2237-0358, Brazil, 2011.

CONFERENCE & WORKSHOP PRESENTATIONS

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| 10/2019 | L. S. Vasconcelos , R. Xu, K. Zhao. A nanoindentation approach to probe composition-dependent diffusion and stress, 56 th SES meeting, St. Louis, MO, USA |
| 05/2019 | L. S. Vasconcelos , K. Zhao. Correlation between pulse charging, volume expansion and structural degradation in silicon electrodes for Li-ion batteries. 365 th ECS meeting, Dallas, TX, USA |
| 10/2018 | L. S. Vasconcelos , R. Xu, N. Sharma, K. Zhao. Chemomechanical behavior of composite electrodes in Li-ion batteries: experiments and modeling. 55 th SES meeting, Madrid, Spain |
| 08/2018 | L. S. Vasconcelos , R. Xu, H. Sun, N. Sharma, K. Zhao. In-situ nanoindentation measurement of local mechanical behavior of composite electrodes in liquid electrolyte. 4 th Midwest Mechanics of Materials and Structures Workshop, Illinois Institute of Technology, IL, USA |
| 08/2017 | L. S. Vasconcelos , R. Xu, K. Zhao. Operando nanoindentation of Li-ion battery materials. 3 rd Midwest Mechanics of Materials and Structures Workshop, Purdue University, IN, USA |
| 04/2017 | L. S. Vasconcelos , R. Xu, K. Zhao. In situ measurement of elastic and viscoplastic properties of lithiated silicon and lithium metal for Li-ion batteries. MRS Spring meeting, Phoenix, AZ, USA |

- 08/2016 **L. S. Vasconcelos**, R. Xu, K. Zhao. In-situ mechanical characterization of electrodes in Li-ion batteries. 2nd Midwest Mechanics of Materials and Structures Workshop, Northwestern University, IL, USA
- 05/2014 **L. S. Vasconcelos**, Altair multibody dynamics workshop, Federal University of São João Del Rei, Brazil

POSTER EXHIBIT

- 08/2015 **L.S. Vasconcelos**, R. Xu, K. Zhao. Mechanical characterization of composite cathode materials. 1st Midwest Mechanics of Materials and Structures Workshop, University of Illinois Urbana-Champaign, IL, USA