

# William LePage

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## Education

- 2018 Ph.D., Mechanical Engineering, University of Michigan
- 2015 M.S.E., Mechanical Engineering, University of Michigan
- 2013 B.S., Mechanical Engineering, Spanish minor, *summa cum laude*, University of Tulsa

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## Research Experience

### University of Michigan

- 2018–present Postdoctoral Researcher, *Dasgupta Research Group*  
Research Focus: Novel Solid-State Battery Architectures via Atomic Layer Deposition  
*Advised by Prof. Neil Dasgupta*
- 2013–2018 Graduate Student Research Assistant, *Advanced Materials and Mechanics Laboratory*  
Dissertation: Multiscale Investigation of Shape Memory Alloy Fatigue  
*Advised by Prof. Samantha Daly and Prof. John Shaw*

### Sandia National Laboratories

- 2012 & 2013 Summer Research Intern, *Thermal Spray Research Laboratory*  
Designed and fabricated electrical and mechanical devices for thermal spray experiments.  
*Advised by Dr. Aaron Hall*

### The University of Tulsa

- 2009–2013 Undergraduate Researcher, *Sustainable Engineering for Needy and Emerging Areas*  
Designed, tested, and deployed a solar-powered chlorine generator for water purification.  
Engaged in two summers and three semesters of research sponsored by the Tulsa Undergraduate Research Challenge.  
*Advised by Prof. John Henshaw and Prof. Gordon Purser*

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## Awards and Fellowships

- 2018 First prize, Society for Experimental Mechanics International Student Paper Competition (selected from 43 international participants after written and oral presentation rounds)
- 2018 Robert M. Caddell Memorial Award for Research, University of Michigan Department of Mechanical Engineering (jointly with Prof. Sam Daly and Prof. John Shaw)
- 2017 Honorable mention, Richard and Eleanor Towner Prize for Outstanding Ph.D. Research, University of Michigan College of Engineering (one of two nominees from Department of Mechanical Engineering, and among the top five overall from the 23 college-wide participants)
- 2017 Best poster presentation, Materials Research Symposium, University of Michigan (selected among 44 graduate student poster presenters)
- 2017 First prize, Young Stress Analyst Competition, British Society for Strain Measurement (selected from 16 international participants after written and oral presentation competition rounds)
- 2014 Fellow, National Defense Science and Engineering Graduate (NDSEG) Program
- 2014 Honorable mention, NSF Graduate Research Fellowship Program
- 2013 Fellow, Tau Beta Pi Anderson Fellowship

- 2012 Finalist, Rhodes Scholarship, District VIII  
2012 Goldwater Scholar  
2011 & 2012 Udall Scholar

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## Publications

### Peer-reviewed journal papers

1. **LePage W**, Chen Y, Kazyak E, Chen K, Sanchez A, Poli A, Arruda E, Thouless MD, Dasgupta N. Lithium mechanics: critical roles of strain rate and temperature and implications for lithium metal batteries. *Submitted*.
2. Pelton A, Pelton S, Joern T, Ulmer J, Niedermaier D, Plaskonka K, **LePage W**, Saffari P, Mitchell M. The quest for fatigue-resistant Nitinol for medical implants. *Submitted*.
3. **LePage W**, Ahadi A, Lenthe W, Sun QP, Pollock T, Shaw J, Daly S. Grain size effects on NiTi shape memory alloy fatigue crack growth. *Journal of Materials Research* (invited feature paper), 2017. <https://doi.org/10.1557/jmr.2017.395>
4. **LePage W**, Shaw J, Daly S. Optimized paint sequence for speckle patterns in digital image correlation. *Experimental Techniques*, 2017. doi:10.1007/s40799-017-0192-3
5. Chen K, Wood K, Kazyak E, **LePage W**, Davis A, Sanchez A, Dasgupta N. Dead lithium: mass transport effects on voltage, capacity, and failure of lithium metal anodes. *Journal of Materials Chemistry A*, 2017. doi:10.1039/c7ta00371d
6. **LePage W**, Daly S, Shaw J. Cross polarization for improved digital image correlation. *Experimental Mechanics*, 2016. doi:10.1007/s11340-016-0129-2
7. Athuada T, **LePage W**, Chalker J, Ozer R. High density growth of ZnO nanorods on cotton fabric enables access to a flame resistant composite. *RSC Advances*, 2014. doi:10.1039/C4RA01543F

### Other publications

1. **LePage, W**. DigitalImageCorrelation.org: a practical guide to DIC. Website published in 2017 as an outreach and service for the experimental mechanics community. <http://digitalimagecorrelation.org/>
2. Sarobol P, Hall A, Miller S, Knight M, **LePage W**, Sobczak C, Wesolowski D. Feasibility of preparing patterned molybdenum coatings on bismuth telluride thermoelectric modules. *Sandia National Laboratories*, 2013. SAND2013-7962
3. **LePage W**, Hampton K, Johnson B, Mayer K, Henshaw J, Purser G. Design and Development of a Portable Off-Grid Water Chlorination System. *International Mechanical Engineering Congress*, 2011. doi:10.1115/IMECE2011-63838

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## Invited presentations

- 30 Aug. 2017 **LePage W**, Shaw J, Daly S. Multiscale experimental investigation of fatigue cracks in nanocrystalline NiTi. *Young Stress Analyst competition (plenary), International Conference on Advances in Experimental Mechanics*, Sheffield, UK.
- 25 Aug. 2017 **LePage W**. An introduction to optical and SEM digital image correlation with applications for NiTi shape memory alloy. *Medtronic Technical Forum*, Mounds View, Minn.
- 10 Oct. 2014 **LePage W**. Speaker for dedication ceremony of new addition to U-M Mechanical Engineering building, G.G. Brown Laboratories. One of two doctoral students selected by Prof. Kon-Well Wang, Department Chair. Ann Arbor, Mich.

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## Presentations

- 4 June 2018 **LePage W**, Shaw J, Daly S. Multiscale investigation of fatigue in shape memory alloys. *Society for Experimental Mechanics*, Greenville, S.C.
- 14 July 2017 **LePage W**, Ahadi A, Lenthe W, Sun QP, Pollock T, Shaw J, Daly S. Fatigue cracking in nanocrystalline NiTi SMA. *International Conference on Martensitic Transformations*, Chicago, Ill.
- 14 June 2017 **LePage W**, Ahadi A, Lenthe W, Sun QP, Pollock T, Shaw J, Daly S. Grain size dependence on fatigue cracking in NiTi SMA. *Society for Experimental Mechanics*, Indianapolis, Ind.
- 1 Mar. 2017 **LePage W**, Shaw J, Daly S. Multiscale experimental investigation of fatigue crack growth in nanocrystalline NiTi. *The Minerals, Metals and Materials Society*, San Diego, Calif.
- 23 Aug. 2016 **LePage W**, Shaw J, Daly S. Thermomechanical characterization of shape memory alloy fracture. *International Congress of Theoretical and Applied Mechanics*, Montreal, Canada.
- 8 June 2016 **LePage W**, Daly S, Shaw J. Cross polarization for improved digital image correlation. *Society for Experimental Mechanics*, Orlando, FL.
- 6 June 2016 **LePage W**, Shaw J, Daly S. Grain size effects on fatigue crack growth in nanocrystalline NiTi. *Society for Experimental Mechanics*, Orlando, FL.
- 18 Feb. 2016 **LePage W**, Shaw J, Daly S. Thermomechanical characterization of shape memory alloy mode I fracture behavior. *The Minerals, Metals and Materials Society*, Nashville, Tenn.
- 9 June 2015 **LePage W**, Shaw J, Daly S. Thermomechanical characterization of shape memory alloy mode I fracture behavior. *Society for Experimental Mechanics*, Costa Mesa, Calif.
- 1 Oct. 2014 **LePage W**, Daly S. Time and surface dependency during fracture of NiTi shape memory alloy. *Society of Engineering Science*, West Lafayette, Ind.
- 17 June 2014 **LePage W**, Daly S. Fracture and strain rate dependency in NiTi shape memory alloy. *US National Committee on Theoretical and Applied Mechanics*, East Lansing, Mich.
- 25 May 2014 **LePage W**, Daly S. Fracture and strain rate dependency in NiTi shape memory alloy. *Society for Experimental Mechanics Midwest Student Symposium*, Ann Arbor, Mich.
- 15 Nov. 2011 **LePage W**, Hampton K, Johnson B, Mayer K, Henshaw J, Purser G. Design and development of a portable off-grid water chlorination system. *International Mechanical Engineering Congress*, Denver, Colo.

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## Teaching and Mentoring

- Winter 2018 Graduate Student Instructor for junior-level course in mechanics of materials (ME 382)
- Delivered three guest lectures
  - Coached students during office hours
  - Assisted the instructor with creating and grading homeworks and exams
- 2015–present Guest lecturer for fifteen lectures at both the undergraduate and graduate levels
- Sophomore-level solid mechanics (ME 211, Fall 2015 for Prof. Ellen Arruda)
  - Junior-level mechanics of materials (ME 382, Winter 2016 for Prof. Jeff Sakamoto; Fall 2016, Winter 2017, and Winter 2018 for Dr. Kathy Sevener)
  - Senior-level advanced energy solutions (ME 433, Winter 2017 for Prof. Neil Dasgupta, and Spring 2017 for Prof. Claus Borgnakke)
  - Graduate-level plasticity (ME 517, Fall 2015 for Prof. Samantha Daly)
  - Graduate-level defects in materials (ME 599, Winter 2018 for Prof. Yue Fan)

Fall 2017 Volunteer instructor for a senior citizen study group course titled, “Renewable energy: the science, state of the art, and future of renewables.”

- o Created course materials and facilitated six 90-minute sessions with about twenty senior citizens, through the Osher Lifelong Learning Institute (OLLI) at the University of Michigan.
- o After the course, the chairperson of OLLI Study Group Committee sent me this note about a result from the course survey: “I can’t recall ever having seen an evaluation response like this: ‘*The best OLLI instructor, I’ve ever had. Articulate, responsive to class, knowledgeable, good communicator.*’ Kudos to you. So appreciative of the time you’ve given to OLLI during your graduate work.”

2015–2017 Mentor for undergraduate researchers

- o Advised Yuxin Chen (University of Michigan, B.S.M.E. and B.S.E.E., 2017) in researching the role of the combined electrochemical and mechanical properties of lithium metal anodes for next-generation battery technologies.
- o Advised Avery Samuel (University of Michigan, B.S.M.S.E., 2016) in an investigation of sample geometry effects for the activation of martensitic phase transformations in shape memory alloys.
- o Advised Jalil Alidoost (University of Michigan, B.S.M.E., 2016) in studies of non-destructive fatal crack detection methods.

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## Service and Outreach

2017–present Board member and lead person for Scanning Electron Microscopy Digital Image Correlation (SEM-DIC), Society for Experimental Mechanics DIC Challenge (<http://sem.org/dic-challenge>).

2014–present Journal article reviewer for *Advanced Materials Interfaces* (1), *Experimental Mechanics* (11), *Journal of Evaluation and Testing* (1), *Journal of Intelligent Material Systems and Structures* (1), *International Journal of Fracture* (2), *Science* (1), *Shape Memory and Superelasticity* (2), and *Ultramicroscopy* (1).

2017 Session chair, International Conference on Martensitic Transformations 2017, Chicago, Ill.

2018 Volunteer, Research and Education Activities for Classroom Teachers (REACT) Workshop at University of Michigan. Spearheaded the Mechanical Engineering Department’s contributions to this one-day workshop that hosted seventy K-12 science teachers; over four months, I developed two programming and robotics activities to share with the teachers, and coordinated lab tours and student volunteers.

2016–present Volunteer, Science Olympiad assistant coach and assistant coordinator for the Science Olympiad team at Spiritus Sanctus Academy elementary school. Introduced the Science Olympiad program to a new school; developed the team’s website and online registration, and served as assistant coach for the “On Target” event for four teams of students (grades 2 through 5).

2014–present Guest lecturer for elementary school science classes on the topics of engineering, materials science, agriculture, and the environment.

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## Professional Development

July 2018 Completed an online workshop through University of Michigan on **engaging students with active learning**. Surveyed examples of teaching methods that promote students to practice, and focused on how to implement effective “think-pair-share” exercises.

- June 2018 Completed **Research-Based Practices for College Teaching**, an online workshop sponsored by the University of Michigan Center for Research on Learning and Teaching. Studied research-based practices that can be used to promote student success, including activating prior knowledge and motivating students with real-world examples.
- May 2018 Completed the University of Michigan's **Preparing Future Faculty seminar**, a nationally-recognized, ten-day program for launching future faculty with successful teaching approaches. The seminar included studying course design, inclusive teaching, and assessment; reading the book "How Learning Works: 7 Research-Based Principles for Smart Teaching;" and composing a sample course syllabus.
- Feb. 2018 Completed the **Active Learning Practice seminar** sponsored by the University of Michigan Center for Research on Learning and Teaching. I prepared and delivered a sample lecture that included demonstrations of material properties and engaged students with practice problems.