

# Luz D. Sotelo

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## EDUCATION

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**University of Nebraska-Lincoln** | Lincoln, Nebraska Expected Graduation: 2021  
Ph.D. in Mechanical Engineering and Applied Mechanics  
Areas of Interest: Ultrasound Nondestructive Evaluation, Microstructure, Complex Material Domains, Acoustic Metamaterials, Additive Manufacturing, Hybrid Processes, Mechanotransduction, Optimization.  
Advisor: Joseph A. Turner

**University of Texas Rio Grande Valley** | Edinburg, TX 2016  
B.S. in Mechanical Engineering, *Summa Cum Laude*  
Senior Design: "A Filament Extruder for 3D Printing Applications" ([youtu.be/YF3BGwXnyek](https://youtu.be/YF3BGwXnyek))  
Advisors: Samantha Ramirez, Robert Jones, Javier Kypuros, Constantine Tarawneh

## GRANTS AND FELLOWSHIPS

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### Grants

University of Nebraska-Lincoln Graduate Student Assembly, Special Projects Grant Program, "College of Engineering Graduate Student Symposium", \$1000 (2020). *Primary applicant, writer.*

National Science Foundation, Graduate Research Internship Program, "In Situ and Ex Situ Ultrasonic Non Destructive Evaluation of Metal Additive Manufacturing Parts for Acoustic Metamaterials", \$5000 (2020). *Primary applicant.*

NASA Nebraska EPSCoR, NASA Nebraska Space Grant, "In Situ Ultrasonic Monitoring of Metal Additive Manufacturing Processes", \$5000 (2019-2020). *Technical writer, editor, and figure designer.*

### Fellowships

National Science Foundation Graduate Research Fellowship	2018
University of Nebraska-Lincoln Chancellor's Fellowship	2016
Nebraska Engineering Recruitment Fellowship	2016
Nebraska Mechanical and Materials Engineering Fellowship	2016

## AWARDS AND HONORS

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Great Minds in STEM Outstanding Graduate Student Leadership Award	2019
Great Minds in STEM Union Pacific Scholarship	2019
Society of Hispanic Professional Engineers Faculty Development Symposium Travel Award	2019
NextProf Nexus Workshop Travel Award	2019
University of Nebraska-Lincoln Student Luminary Award, Honorable Mention	2019
University of Colorado Boulder, ACTIVE Faculty Development Workshop Travel Award	2018
Great Minds in STEM, LEVERAGE Early Career Faculty Symposium Travel Award	2018
Ford Foundation Fellowship, Honorable Mention	2018
NDSEG Fellowship, Program Finalist	2018
University of Nebraska-Lincoln Spring Research Fair, Top 5 Poster Award	2018
Mechanical Engineering Undergraduate Student of the Year	2016
Lloyd M. Bentsen Jr. Engineering Excellence Scholarship	2014
Tau Beta Pi (Engineering Honor Society), Chapter Texas Nu	2014
Hispanic Scholarship Fund ExxonMobil Scholarship	2014
American Society of Materials Herman C. Burghard Memorial Scholarship	2013
National Hispanic Professional Organization RGV Endowment Scholarship	2013

## **PUBLICATIONS**

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### **Peer-Reviewed Journal Articles**

- 2020 L.D. Sotelo, H. Hadidi, C.S. Pratt, M.P. Sealy, J.A. Turner, "Ultrasonic Mapping of Hybrid Additively Manufactured Materials" (In Review).
- 2020 M.P. Sealy, H. Hadidi, L.D. Sotelo, W. Li, J.A. Turner, J.A. McGheough, "Compressive behavior of 420 stainless steel after asynchronous laser processing", *CIRP Annals Manufacturing Technology* (To Appear).

### **Peer-Reviewed Conference Proceedings**

- 2019 S. Islam, S. Deshpande, L.D. Sotelo, M. Norouzian, M.T. Lumpkin, L.F. Ammerlaan, A.J. Fuller, J.A. Turner, "Quantitative Ultrasonic Characterization of Subsurface Inclusions in Tapered Roller Bearings", *ASTM 12th International Symposium on Rolling Bearing Steels: Progress in Bearing Steel Metallurgical Testing and Quality Assurance*, May 15-17, 2019.
- 2016 C. Tarawneh, L. Sotelo, A. Villarreal, N. de los Santos, R. Lechtenberg, R. Jones, "Temperature Profiles of Railroad Tapered Roller Bearings with Defective Inner and Outer Rings", *ASME Joint Rail Conference*, April 12-15 2016.

## **PRESENTATIONS**

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### **Invited Talks**

- 2020 L.D. Sotelo, "The Ripple Effect", Talent Acquisition Team National Meeting, *Union Pacific Headquarters*, Omaha, NE.
- 2019 J.A. Turner, L.D. Sotelo, C.S. Pratt, R. Karunakaran, C.J. Kanger, M.P. Sealy, "Integrated In Situ and Ex Situ Ultrasonic Characterization of Ti6Al4V parts made with DED AM with Hybrid Capabilities", *178th Meeting of the Acoustical Society of America*, Invited Session, Coronado, CA.
- 2019 L.D. Sotelo, J.A. Turner, "Ultrasonic Scattering for Materials Characterization: Optimization and Applications in Metal Additive Manufacturing", Invited Seminar, *Doane University*, Crete, NE.
- 2019 L.D. Sotelo, M.P. Sealy, J.A. Turner, R. Karunakaran, C.J. Kanger, "Enhanced Ultrasonic Characterization of Metal Additively Manufactured Parts using Hybrid Capabilities", Invited Seminar, *University of Texas Rio Grande Valley*, Edinburg, TX.

### **Conference Oral Presentations**

- 2019 L.D. Sotelo, C.S. Pratt, H. Hadidi, M.P. Sealy, J.A. Turner, "Ultrasonic Non Destructive Characterization of Hybrid Additively Manufactured 420 Stainless Steel made with Directed Energy Deposition", *178th Meeting of the Acoustical Society of America*, Coronado, CA.
- 2019 L.D. Sotelo, H. Hadidi, C.S. Pratt, M.P. Sealy, J.A. Turner, "Ultrasonic Non Destructive Characterization of Hybrid Additively Manufactured 420 Stainless Steel made with Directed Energy Deposition", *46th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Portland, OR.
- 2019 L.D. Sotelo, C.S. Pratt, J. Wicks, K. Reddy, P. Rao, J.A. Turner, "Effects of Manufacturing Process on the Microstructure of Ti6Al4V and Implications for Grain Sizing based on Normal Incidence Diffuse Ultrasonic Backscatter", *46th Annual Review of Progress in Quantitative Nondestructive Evaluation*, Portland, OR.

- 2019 L.D. Sotelo, R. Karunakaran, C.J. Kanger, M.P. Sealy, J.A. Turner, "In Situ Ultrasonic Characterization of Ti6Al4V parts made with Directed Energy Deposition Additive Manufacturing using Hybrid Capabilities", *46<sup>th</sup> Annual Review of Progress in Quantitative Nondestructive Evaluation*, Portland, OR.
- 2019 L.D. Sotelo, M.P. Sealy, R. Karunakaran, C.J. Kanger, J.A. Turner, "Enhanced Ultrasonic Characterization of Metal Additively Manufactured Parts using Hybrid Capabilities", *Nebraska Academy of Sciences Annual Spring Meeting*, Lincoln, NE.
- 2019 L.D. Sotelo, M.P. Sealy, J.A. Turner, R. Karunakaran, C.J. Kanger, "Enhanced Ultrasonic Characterization of Metal Additively Manufactured Parts using Hybrid Capabilities", *The TMS Annual Meeting and Exhibition*, San Antonio, TX.
- 2018 L.D. Sotelo and J.A. Turner, "Parametric Optimization of the Measurement System for Grain Sizing based on Normal Incidence Diffuse Ultrasonic Backscatter", *45<sup>th</sup> Review of Progress in Quantitative Nondestructive Evaluation*, Burlington, VT.
- 2016 C. Tarawneh, L. Sotelo, A. Villarreal, N. de los Santos, R. Lechtenberg, R. Jones, "Temperature Profiles of Railroad Tapered Roller Bearings with Defective Inner and Outer Rings", *ASME Joint Rail Conference*, Columbia, SC.
- 2016 L. Sotelo, C. Tarawneh, A. Villarreal, N. de los Santos, R. Lechtenberg, R. Jones, "Temperature Profiles of Railroad Tapered Roller Bearings with Defective Inner and Outer Rings", *UTRGV Engaged Scholar Symposium*, Edinburg, TX.
- 2016 L. Sotelo, "Measurement of Train Kinematic Parameters Utilizing Vibration Monitoring Techniques", *UTCRC-NTC Symposium*, Lincoln, NE.
- 2015 L. Sotelo, Y.G. Park, S. Jung, S. Ryu, "Swimming Vorticella Convallaria in 2-D Confined Geometries", *American Physical Society's March Meeting*, San Antonio, TX.

### Poster Presentations

- 2018 L.D. Sotelo and J.A. Turner, "Characterization of Near-Race Subsurface Inclusions Detected with Ultrasonic Surface Waves in Railroad Tapered Roller Bearings", *University of Nebraska-Lincoln Spring Research Fair*, Lincoln, NE.
- 2015 L. Sotelo, "A Method for the Analysis of Inclusions in Railroad Bearing Steel", *UTCRC Research Symposium*, Edinburg, TX.
- 2014 L. Sotelo, Y.G. Park, S. Jung, S. Ryu, "Swimming Vorticella Convallaria in Various Confined Geometries", *67<sup>th</sup> Annual Meeting of the American Physical Society's Division of Fluid Dynamics*, San Francisco, CA.

### RESEARCH EXPERIENCE

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#### University of Nebraska-Lincoln Department of Mechanical and Materials Engineering

Quantitative Ultrasonics Lab, advised by Joseph A. Turner August 2016 – Present  
 Developing in situ and ex situ quantitative ultrasound NDE measurement, calibration, and signal processing systems for complex material domains, with an emphasis in metal additive manufacturing.

Nebraska Transportation Center, advised by Laurence R. Rilett June 2016 – August 2016  
 Designed, built, and tested a portable system for the in situ vibration and dynamic monitoring of freight trains.

Quantitative Ultrasonics Lab, advised by Joseph A. Turner June 2015 – August 2015  
Defined a procedure for the detection, exposure, and analysis of inclusions in railroad bearing steel.

Bio-Flow Research Lab, advised by Sangjin Ryu July 2014  
Investigated the kinematics of cell motility in confined geometries through experiments and image processing.

### **University of Texas Rio Grande Valley Department of Mechanical Engineering**

University Transportation Center for Railway Safety, advised by Constantine Tarawneh August 2015 – May 2016  
Monitored and analyzed temperature and vibration emissions of railroad bearings during fatigue life testing.

Biomechanics Lab, advised by YoungGil Park August 2014 – June 2015  
Developed an image analysis protocol to identify and track moving cells in 2D space.

### **TEACHING AND MENTORING EXPERIENCE**

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#### **University of Nebraska-Lincoln Department of Mechanical and Materials Engineering**

Co-Instructor, Laboratory Lead January 2020 - Present  
*Ultrasound in Additive Manufacturing*  
(New research based graduate course developed in collaboration with J.A. Turner and M.P. Sealy)

Project Mentor January 2019 – July 2019  
*Additive Manufacturing, Mechanical Engineering Senior Design*

Guest Lecturer January 2018 – December 2018  
*Vibration Theory and Applications, Analytical Methods in Engineering.*

Graduate Teaching Assistant August 2016 – May 2017  
*Mechanics of Elastic Bodies*

#### **University Transportation Center for Railway Safety, Nebraska Transportation Center, and Texas A&M Transportation Institute**

Program Mentor May 2016 – August 2016  
*UTRCS Research Experience for Undergraduates.*

#### **University of Texas Rio Grande Valley Department of Mechanical Engineering**

Undergraduate Teaching Assistant August 2014 – May 2015  
*Materials Laboratory, Engineering Analysis I*

### **FIELD EXPERIENCE**

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**Nebraska Transportation Center** 2016  
Vibration and Dynamic Freight Train Monitoring Tests

### **SERVICE AND OUTREACH**

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#### **Profession**

Society of Hispanic Professional Engineers, National Convention Poster Competition Reviewer 2019  
Society of Hispanic Professional Engineers, Lincoln Chapter, Community Service Chair (2018 – 19) 2018 – Present  
*Noche de Ciencias, Lincoln High School Bilingual Career Fair, Introduce a Girl to Engineering Day*

Society of Women Engineers, Lincoln Chapter, Graduate School Panelist	2018, 2020
Society of Automotive Engineers, UTRGV Chapter, HESTEC and E-week Outreach	2014 – 2015
Society of Manufacturing Engineers, UTRGV Chapter, HESTEC and E-week Outreach	2013 – 2014

## University

### **University of Nebraska-Lincoln**

Graduate Student Assembly, Executive Vice President Elect	2020 – Present
Chancellor’s Student Committee on Sexual Misconduct Member	2019 – Present
Executive Vice Chancellor of Academic Affairs Student Advisory Board Member	2019 – Present
Parking Advisory Committee, Vice Chair	2019 – Present
Graduate Student Assembly, Vice President of Student Affairs	2019 – 2020
Graduate Student Assembly Diversity and Inclusion Committee, Member (2017 – 18), Chair <i>Diversity and Inclusion Coffee Hour, Sexual Assault Awareness #HuskerOut Event, Campus Climate Coffee Hour, Title IX Awareness #HuskerOut Event, Academic Freedom Informational Panel.</i>	2018 – 2019
College of Engineering Task Force on Diversity and Inclusion	2019
College of Engineering Graduate Student Advisory Board, Founding Member <i>Organizer of the inaugural 2020 College of Engineering Graduate Student Symposium</i>	2019 – Present
College of Engineering Dean Search Committee	2018
Mid-America Transportation Center Scholars Program Panelist	2017
Nebraska Transportation Center STEM Summer Camps Volunteer	2015 – 2016

### **University of Texas Rio Grande Valley**

University Transportation Center for Railway Safety, STEM Summer Camps Volunteer	2015 – 2016
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## Department

### **University of Nebraska-Lincoln Mechanical and Materials Engineering**

MME Graduate Student Association, Founding President (2018 – 19), Communications Chair <i>Research Fair, Graduate Student Appreciation Events, Student Profiles Website, Orientation, Recruitment</i>	2018 – Present
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## Community

Mechanical Engineering Volunteer Online Tutor (in response to online instruction due to Covid-19)	2020
Nebraska Coalition to end Sexual Assault and Domestic Violence, Panelist <i>“Coalition Conversations: Survivors and Systems Change”</i>	2019

## **PROFESSIONAL ORGANIZATIONS**

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Acoustical Society of America	2018 – Present
Society of Hispanic Professional Engineers	2018 – Present
Society of Automotive Engineers (jigs, fabrication, and outreach)	2014 – 2015
Society of Manufacturing Engineers (outreach)	2013 – 2014

## **SKILLS**

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**Language:** Fluent in English and Spanish.

**Software:** Matlab™ and Simulink, SolidWorks.

**Instrumentation and Machinery:** Nano-indentation, Scanning Electron Microscopy (SEM), laser confocal microscopy, Energy Dispersive X-Ray Spectroscopy (EDS/EDX), Electron Backscatter Diffraction (EBSD), experimental ultrasonic nondestructive evaluation and material characterization, video microscopy, image analysis, metallography, materials testing, engineering machine shop, Raspberry Pi, simple circuit design and soldering.