

# Naomi Deneke CV

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## EDUCATION:

Purdue University, West Lafayette, IN  
Materials Engineering PhD Candidate

Expected Graduation: Aug. 2022

Prairie View A&M University, Houston, TX  
B.S. Chemical Engineering

May 2017

## RESEARCH EXPERIENCE:

**Illuminating Interfacial Mechanics Lab-Purdue University**

**2017 – Present**

**Advisor: Chelsea S. Davis**

Polymer Thin Film Dewetting for a Pressure Tunable Adhesive

- Developed an elastic adhesive with controllable adhesion through surface patterning via polymer thin film dewetting. The adhesive's sensitivity to applied pressure can be controlled by changing the size of the patterned surface asperities.

Indentation of a Stretched Soft Viscoelastic Substrate

- Investigated the effects of solid surface tension on soft materials due to stretching by axisymmetric indentation testing. Changes in the interfacial contact area reveal information about the surface mechanics of a stretched viscoelastic substrate.
- Designed a custom adhesion testing device that performs indentation experiments. The device is LabVIEW compatible with nano-scale resolution in displacement and micron-scale resolution in load.

**Nave Lab- Prairie View A&M University**

**2015 – 2017**

**Advisor: Audie Thompson**

Novel Hydrogel Membranes for Therapeutic Ocular Treatments

- Characterized the release of model proteins incorporated in the matrix structure of Poly(vinyl) Alcohol hydrogel membranes for the application of medicated contact lenses.
- Characterization techniques include FTIR, SEM, TGA, and UV spectroscopy. Theoretical kinetic models were developed to understand the release behavior.

## PUBLICATIONS:

1. A. Acuna, J. M. Jimenez, **N. Deneke**, S.M. Rothenberger, S. Libring, L. Solorio, V. Rayz, C.S. Davis, S. Calve, "Design and validation of a modular micro-robotic system for the mechanical characterization of soft tissues." *Acta Biomaterialia*, <https://doi.org/10.1016/j.actbio.2021.07.035>.
2. **N. Deneke**, A.L. Chau, C.S. Davis, "Pressure tunable adhesion of rough elastomers." *Soft Matter*, 17, **2021**, 863-869.
3. **N. Deneke**, M.R. Rencheck, C.S. Davis, "An Engineer's Introduction to Mechanophores." *Soft Matter*, 16(27), **2020**, 6230-6252.
4. **N. Deneke**, S. Dohadwala, Q. Moore, F. Nave, A. Thompson, "Evaluating Alternative Crosslinking agents in PVA Hydrogel Membranes." *Pursue Undergraduate Research Journal*, 1 (2) **2018**, 63-81.

## WORK EXPERIENCE:

**3M** **Summer Research & Development Intern** **2021**

- Modified chemical formulations to develop new adhesives for electronic displays with improved fatigue resistance
- Performed screenings of raw materials for formulation substitutions
- Fabricated adhesives using hot melt extrusion and roll-to-roll processing

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- Characterized the performance of tapes using various mechanical and adhesion characterization tests.

## **Research Experience for High Schoolers Mentor/Program Coordinator 2017**

- Organized activities and training in research fundamentals for high school students participating in a summer research program at Prairie View A&M University

## **Sandia National Laboratories Purchase Product Engineer 2016**

- Restructured the organizational hierarchy of over 300 chemicals and components used in fabrication and maintenance of neutron generators by analyzing their chemical properties, physical properties, and specific use in order to increase visibility of the commodities.
- Organized an interactive STEM outreach event for fifty grade-school girls on behalf of Sandia.

## **DuPont, Pasadena, TX Chemical Engineering Intern 2015 – 2016**

- Performed a self-designed study that reported our site's Kapton film defect detection capabilities. Provided recommendations for improvements on our optical inspection system to increase detection from 54% to 80%.
- Conducted investigations to find the root cause of poor quality Kapton films.
- Conducted a Management of Change process in order to upgrade field equipment that are essential in maintaining the quality of polymer films made at the site.
- Increased the efficiency and functionality of a dynamic Management of Change spreadsheet by improving VBA coding.

## **PRESENTATIONS AND POSTERS:**

1. **N. Deneke**, J. Booth, E. Chan, C.S. Davis, "Pressure Tunable Adhesion," *Adhesion Science Gathering*, Virtual, September 2021.
2. **N. Deneke**, J. Booth, E. Chan, C.S. Davis, "Pressure Tunable Adhesion," *Adhesion Society Meeting*, Virtual, February 2021.
3. **N. Deneke**, A.L. Chau, C.S. Davis, "Controlled Adhesion by Polymer Thin Film Dewetting on a Silicone Substrate," *Adhesion Society Meeting*, Charleston, SC, February 2020.
4. **N. Deneke**, A.L. Chau, C.S. Davis, "Controlled Adhesion by Polymer Thin Film Dewetting on a Silicone Substrate," *Sigma Xi Poster Competition*, West Lafayette, IN, February 2020.
5. **N. Deneke**, E. Ghimire, C.S. Davis, "Adhesive Contact on an Unconfined Stretched Viscoelastic Substrate," *Notre Dame-Purdue Soft Matter and Polymers Symposium*, West Lafayette, IN, September 2019.
6. **N. Deneke**, E. Ghimire, C.S. Davis, "Adhesive Contact on an Unconfined Stretched Viscoelastic Substrate," *Gordon Research Conference – Science of Adhesion*, South Hadley, MA, July 2019.

## **LEADERSHIP, ACTIVITIES, AWARDS:**

- Purdue George Washington Carver Fellow (5 year PhD funding) 2017 – 2022
- TMS Congressional Visit Day- Lobby for Science & Technology 2018
- Gordon Research Seminar - Science of Adhesion Chair 2019 – 2021
- Purdue Materials Engineering Graduate Student Association Outreach Officer 2018 – 2019
- Prairie View A&M University Chemical Engineering Researcher of the Year 2017
- University of Houston National Society of Black Engineers Secretary 2013 – 2014
- Dean's List Honor Roll 2015 – 2017
- Program for Mastery in Engineering Studies Honor Roll 2013

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## PROFESSIONAL ORGANIZATIONS

- Adhesion Society 2020 – Present
- American Institute of Chemical Engineers 2017 – Present
- National Society of Black Engineers 2014 – Present
- Omega Chi Epsilon Chemical Engineering Honor Society 2016 – 2017

## TECHNICAL / NON-TECHNICAL SKILLS AND TRAINING:

- Experience with: LabVIEW, MATLAB, VBA, Polymath, HYSYS
- Equipment: Confocal Microscopy, Epifluorescence Microscopy, Optical Profilometry, Contact Angle Goniometry, Atomic Force Microscopy, Interferometry, Fourier-Transform Infrared Spectroscopy
- Training: Process Safety Management
- Soft Skills: Excellent in a team environment, great interpersonal skills, goal oriented