

Rachael L. Muschalek
Graduate Student, Biomedical Engineering
Texas A&M University
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EDUCATION

Texas A&M University **Expected May 2017**
Master of Science, Biomedical Engineering (BMEN) **GPA: 4.000/4.000**
Advisor: Dr. Duncan Maitland
Thesis: "The Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices"

Texas A&M University **May 2015**
Bachelor of Science, BMEN **GPA: 3.814/4.000**
Honors Distinction for Undergraduate Thesis: "Synthesis of Polyurethane Shape Memory Polymers onto a Nickel-Titanium Wire"
Accepted into BMEN "Fast Track" Program and completed 14 hours of graduate classes upon graduation.

Study Abroad: Akademie für Internationale Bildung, Bonn, Germany **Spring 2013**
Observed surgeries/ shadowed a clinical neuroscientist for technical elective credit
Programmed a fully functional ECG diagnostic program in Matlab and Labview

HONORS AND AWARDS

Student representative for the departmental ABET accreditation audit	Fall 2016
BMES Annual Meeting Scholarship	Fall 2016
Graduate Student Presentation Grant, TAMU Office of Graduate and Professional Studies	Fall 2016
Medical College Admissions Exam (MCAT): 518 or 97 th Percentile	May 2016
Merit Fellowship, Texas A&M University	Sept 2015-Present
Enrichment Fellowship Award, BMEN	September 2015
Best Capstone Design Project, TAMU Engineering Showcase*	May 2015
First Place, Undergraduate Oral Research Presentation, Student Research Week*	March 2015
Alpha Eta Mu Beta, BMEN Honor Society	Spring 2014- Present
Phi Eta Sigma National Honor Society	January 2012
Research Opportunities for Engineers Grant	October 2013
Undergraduate Research Scholar	September 2013
Presidential Endowed Scholarship, Texas A&M University	May 2011
Masonic Legion Award and Scholarship	May 2011
Comal County Aggie Mom's Club Scholarship	May 2011
Dean's Distinguished Student Award	Fall 2013, Spring 2014, Fall 2014, Spring 2015

EXPERIENCE

Keller Periodontics, New Braunfels Texas **Summer 2012, Winter Break 2012**
Shadowing Intern
Shadowed Dr. Keller during oral surgeries and while he delivered outpatient general anesthesia
Gained valuable business knowledge about running a private practice

Biomedical Device Laboratory, Texas A&M University

Dr. Duncan Maitland, PI

- Studied effects of Isophorone Diisocyanate on hydrophobicity of shape memory polymer foams

Culminated in poster presentation in August

Summer 2013

- Independent research into adherence of shape memory polymer foams to a nickel-titanium wire.
Received Research Opportunities for Engineers Grant to fund independent research in Fall 2013.
Wrote undergraduate thesis on the subject **Fall 2013-Spring 2014**
- Research into the effects of sterilization methods on polyurethane shape memory polymers, publication resulting from this research will be used in a 510 (k) filing to the FDA **Fall 2015-Present**

Course Development-- Dr. Jeremy Wasser

“Physiology as Seen in the Television Series ‘Dr. House, M.D.’”

Fall 2013

Aggie Research Scholars Program- Team Leader

Summer 2014

Trained five undergraduate researchers in basic research principles
Managed students during a ten-week summer research project to create functioning machine prototype

Shape Memory Therapeutics, College Station, Texas

May 2014-May 2015

Biomedical Engineering Intern

Research and Development of a polyurethane coating as a moisture diffusion barrier for medical devices

Texas A&M Senior Design Team, Sponsor: Hanger, Inc.

Fall 2014-Spring 2015

Led a team of five students to create a rapidly manufactured, low-cost, monolithic prosthesis

***Awarded “Best Capstone Project”** out of 160 projects in the Dwight Look College of Engineering

Award for best feedback from sponsors out of 14 biomedical engineering teams

Biotex Inc., Product Development Intern

Summer 2015

Learned design controls and quality assurance procedures

Graduate Teaching Assistant, BMEN 305- Bioinstrumentation

Fall 2016

Lead an circuits laboratory for junior level BMEN students

Included building circuitry for a Pulse Oximeter and ECG

PUBLICATIONS, PRESENTATIONS, AND PATENTS

A. Publications

- **R. Muschalek**, Nash L.D., Jones R, Hasan S.M., Keller B.K., Monroe M.B., Maitland D.J. “Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices.” *Journal of Medical Devices*. August 2016. *Submitted*.
- K. Ezell, Nash L.D., **Muschalek R.L.**, Maitland D.J., “Development and Characterization of Radiopaque Shape Memory Polymer Foams.” USRG Report. August 2016.
- Hasan S.M., Weems A.C., **Muschalek R.L.**, Maitland D.J., Wilson T.S. Biodegradation of Shape Memory Polymers. In *Lifetimes and Compatibility of Synthetic Polymers*; Lewicki J; Wiley-Scrivener, 2015. (Book Chapter – Accepted)
- **R. Muschalek**, “Alternative Cures to a Silent Killer” *Explorations Undergraduate Journal*, November 2014.

B. Presentations

- **R. Muschalek**, **Three Minute Thesis Competition, Finalist**

- **R. Muschalek**, Nash L.D., Jones R, Hasan S.M., Keller B.K., Monroe M.B., Maitland D.J. "Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices." *Shape Memory Applications, Research, and Technology (SMART) Conference. December 5-8, 2016. Poster. Accepted.*
- **R. Muschalek**, Nash L.D., Jones R, Hasan S.M., Keller B.K., Monroe M.B., Maitland D.J. "Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices." *Biointerface Workshop and Symposium. October 2-5, 2016. Poster.*
- **R. Muschalek**, Nash L.D., Jones R, Hasan S.M., Keller B.K., Monroe M.B., Maitland D.J. "Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices." *Biomedical Engineering Society Annual Meeting. October 5-8, 2016. Poster.*
- **R. Muschalek** "Synthesis of Shape Memory Polyurethane Foam Over a Nickel-Titanium Backbone Wire for Applications in Aneurysm Treatments," Student Research Week 2015, TAMU ***1st Place Undergraduate Oral Presentation**
- **R. Muschalek**, LD Nash, SM Hasan "TEES 100 Year Anniversary Celebration," Austin State Capital, March 30 2015. Presented research to state legislatures.
- M. Brooks, M. Hasan, **R. Muschalek**, D. Maitland, "The Effects of Isophorone Diisocyanate on the Hydrophobicity of Polyurethane Shape Memory Polymer Foams," TAMU BMEN Graduate Invitational Poster Session. August 2013
- **R. Muschalek**, LD Nash, DJ Maitland "Synthesis of Shape Memory Polymers over a Nickel-Titanium backbone wire." Biomaterials Day 2014, College Station, Texas.
- **R. Muschalek**, LD Nash, DJ Maitland "Fabrication and Preparation of Shape Memory Polymers for Aneurysm Occlusion." REU Undergraduate Poster Session, August 2014

C. Patents

- Duncan Maitland, L.D. Nash, **R.L. Muschalek**, "Polymer Coating as Diffusion Barrier for Controlled SMP Device Expansion" Invention Disclosure Filed through TEES. December 2015.
- **RL Muschalek**, LD Nash, DJ Maitland, K Hearon. "Shape Memory Polymer Foam Synthesis Protocol for Foaming Directly Over Medical Device Substrates." Invention disclosure filed June 2014. *Patent Pending.*

EXTRACURRICULAR AND VOLUNTEER WORK

BwoMEN; women advancing in biomedical engineering	August 2016- Present
Biomedical Engineering Graduate Student Association	August 2015- Present
Communion Bread Coordinator, Declaration Church	October 2015- Present
BMEN Ambassadors Program, President	August 2016- Present
Engineering World Health, Vice President	January 2014-December 2015
Biomedical Engineering Society	Fall 2011- Spring 2015
Zeta Tau Alpha Fraternity, Involvement Chair & Member	Fall 2012 -May 2015
Emergency Room Volunteer, St. Joseph's Hospital	Fall 2012
Sunday School Teacher of 3 and 4 year olds	Summer 2012
The Big Event, Team Leader	Spring 2012, 2014, 2015
Aggie Leaders of Tomorrow: Freshman Leadership Organization	Fall 2011- Spring 2012