

Katherine Elfer, Ph.D.

Graduate Assistant
Department of Biomedical Engineering
Tulane University

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EDUCATION

- Ph. D., Biomedical Engineering**, Tulane University; New Orleans, Louisiana May 2018
The development and evaluation of a pseudo-histological staining and image processing system for use in point-of-care ex-vivo fluorescent histology
Advisor: **Quincy Brown, Ph.D.**
- B.S., Nanosystems Engineering**, Louisiana Tech University; Ruston, Louisiana May 2012
Concentration: Biomedical Engineering; Minor: English

HONORS and AWARDS

- 2018** Tulane 34 Award
Dean of the SSE Award for Excellence in Research and Presentation by a Graduate Student
- 2017** SWE Academic Leadership for Women in Engineering ASSIST Awardee
INSIGHT Into Diversity: 2017 Inspiring Leaders in STEM
Dean Donald R. Moore award for embodiment of servant leadership and exceptional character.
- 2016** New Orleans Women in Tech Ada Lovelace Nominee
Valerie and Michael Corasaniti – Cowen Scholar for service to Tulane and the community
Tulane Center for Public Service, Community Engaged Graduate Fellowship Program
- 2015** People’s Choice Award, Three-Minute Thesis Competition, Tulane University
- 2014** Vincent A. Forte Fellowship Recipient, Louisiana Engineering Foundation
- 2013** Outstanding Teaching Assistant, Tulane Biomedical Engineering
- 2012** National Science Foundation Graduate Research Fellowship Program recipient
National Academy of Engineers Grand Challenges Scholar Program graduate
Outstanding Senior, Louisiana Tech College of Engineering and Science

RESEARCH EXPERIENCE

Research Positions

Graduate Research Assistant

Tulane University, July 2012—Present

EPSCoR Supervised Undergraduate Research Experience

Louisiana Tech University, March 2011—May 2012

Advisor: **David Mills, Ph. D.:** *NanoHealing: Bandage with Bioactive Thinfilm Materials*

NSF REU Brandeis University Biophysics Department

Brandeis University, May 2011-August 2011

Advisor: **Seth Fraden, Ph.D.:** Characterization and Visualization of Functionalized Surfaces

MRSEC NSF REU

Carnegie Mellon University, May 2010-July 2010

Advisor: **Kristin Dahl, Ph.D.**: *Interactions of Single-Walled Carbon Nanotubes with HeLa Actin Filaments*

Funding

- 2012 National Science Foundation Graduate Research Fellowship
\$90,000 Stipend plus educational expenses to cover 3 years of funding between 2012-2017
- 2011 Louisiana Board of Regents EpSCor Supervised Undergraduate Research Experience (SURE)
\$4,000 stipend, \$1,000 travel; September 2011 – June 2012

Publications

1. Liu J, Wang M, Tulman D, Mandava S, **Elfer K**, Gabrielson A, Lai W, Abshire C, Sholl AB, Brown JQ, Lee BR, "Nondestructive Diagnosis of Kidney Cancer on 18-gauge Core Needle Renal biopsy Using Dual-color Fluorescence Structured Illumination Microscopy," *Urology*: 98. December 2016
2. **Elfer KN**, Sholl AB, Wang M, Tulman DB, Mandava Sree, Lee, BR, Brown JQ. "DRAQ5 and eosin ('D&E') as an analog to hematoxylin and eosin for rapid 'zero-cut' fluorescence histology of fresh tissues," *PLOS One*.
3. Liu J, Wang M, Tulman D, Mandava SH, **Elfer KN**, Gabrielson A, Lai W, Abshire C, Sholl AB, Brown JQ, Lee BR. "Non-destructive diagnosis of kidney cancer on 18-gauge core needle renal biopsy using dual-color fluorescence structured illumination microscopy," *Urology*, 98: 195-199.
4. Wang M, Kimbrell H, Sholl AB, Tulman DB, **Elfer KN**, Schlichenmeyer T, Lee BR, Lacey M, and Brown JQ. "High-resolution rapid diagnostic imaging of whole prostate biopsies using video-rate fluorescence structured illumination microscopy," *Cancer Research*.
5. Goel UO, Maddox MM, **Elfer KN**, Dorsey P, Wang M, McCaslin R, Brown JQ*, Lee BR. "Feasibility of quantitative diffuse reflectance spectroscopy for targeted measurement of renal ischemia during laparoscopic partial nephrectomy," *Journal of Biomedical Optics*, 19(10), 107001. 2014.
6. Schlichenmeyer TC, Wang M, **Elfer KN**, Brown JQ, "Video-rate structured illumination microscopy for high-throughput imaging of large tissue areas," *Biomedical Optics Express*, 5(2): 366-377. 2014.
7. Mills D, **Elfer KN**, McNamara Kaitlin, Manuel Morganne, Lvov Y. "Multilayered, Multi-Component Anti-infective Nanocoatings for Biomedicine." Federation of American Societies for Experimental Biology, vol. 26 no1. Supplement 917.1. April 2012.

Conference Presentations - *indicates presenting author

1. **Elfer KN***, Samuel Leuthy, Sholl AB, Brown JQ, "Virtual H&E whole-mount fluorescent histology of the entire prostate surface for real-time surgical guidance," Optical Society of America: 2018 Congress on Biomedical Optics. April 2018.
2. **Elfer KN***, Sholl AB, Wang M, Tulman D, Brown JQ, "Comparison of Monochrome versus Dual-Color Images in Fluorescence Histology on Prostate and Kidney Specimens," Optical Society of America: 2017 Optics in the Life Sciences. April 2017.
3. **Elfer KN***, Sholl AB, Brown JQ, "Topical Fluorescent Stain System for Point-of-Care Lung and Prostate Cancer," Optical Society of America: 2016 Congress on Biomedical Optics, Cancer Therapeutics. April 2016.
4. Wang M*, Tulman D, **Elfer KN**, Sholl AB, Brown JQ, "Rapid diagnostic imaging and pathologic evaluation of surgical tissue using video rate structured illumination microscopy (VR-SIM)." *Proc. SPIE 9698*, Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems. April 27, 2016

5. **Elfer K**, Moore A*, Kimbrell H, Brown JQ, "Fluorescence Staining Strategies for Histological Assessment of Prostate Biopsy." 31st World Congress of Endourology & SWL. April 2013.
6. Wang M*, **Elfer K**, Hoang N, Khismatullin J, Brown JQ, "Spectroscopic High-Intensity Focused Ultrasound (HIFU) Monitoring in Kidney," 31st World Congress of Endourology & SWL. April 2013.

National Conference Poster Presentations - *indicates presenting author

1. Askinas C, **Elfer KN***, Tulman DB, Luethy S, Galliano G, Cohen A, Brown JQ, "Optimization and Validation of BODIPY for Quantification of Steatosis in Donor Transplant Livers," Optical Society of America: 2018 Congress on Biomedical Optics. April 2018.
2. **Elfer KN***, Sholl AB, Brown JQ, "Fluorescent Periodic Acid and Masson's Trichrome for non-destructive tissue analysis," SPIE BiOS Photonics West, January 2018.

Educational Research Activities - *indicates presenting author

1. *[Presentation]* **Elfer KN***, Hicks N*, Spingola E, Fair K, Rynearson A, "Lessons Learned: Strategies for Creating and Mentoring Diverse Graduate Student Communities," Association of Engineering Education: 2017 Annual Conference. June 2017.
2. *[Poster]* **Elfer KN***, "A Preliminary Evaluation of The Tulane Science Scholars Summer Program through Quantitative and Qualitative Self-assessment. (Work in Progress)," Association of Engineering Education: 2017 Annual Conference. June 2017.

PROFESSIONAL SOCIETIES

SPIE – The International Society for Optical Engineering
 Optical Society of America (OSA)
 Biomedical Engineering Society (BMES)
 American Society for Engineering Education (ASEE)
 Society of Women Engineers (SWE)

TEACHING EXPERIENCE

Teaching Interests:

Introductory Courses: Engineering Design, Programming (MATLAB, C, C++, HTML), Optics, Image Processing, Materials Science, Nanotechnology, Circuits, Electronics, Cell Biology, Physics, Mathematics for Engineers (applications, statistics)

Advanced Courses: Biophotonics, Signals and Systems, Microscopy and Imaging Techniques, Image Analysis, Biomaterials, and Technical Communication for Scientists and Engineers

Substitute Instructor: Introduction to Circuits, ENGP 2010

Tulane University, Fall 2013: Managed one TA, two peer mentors, and oversaw 45 undergraduate students

Substituted for the instructor of record as the instructor for 1/3 of course timeline by organizing 18 lectures, 6 homework assignments, and designing and grading 2 exams. I then aided departmental instructors in the design and grading for the remaining 1/3 of the course.

Teaching Assistant: Computing Concepts and Applications, BMEN 2020 + 3 Labs

Tulane University, Spring 2013 | Spring 2017: Managed 2 lab instructors, 52 | 68 undergraduates

Oversaw the 3 days/week labs for the course and organized and presented 6 lectures during the semester. Worked with the instructor to create homework, quizzes and tests and graded exams.

Teaching Assistant: Introduction to Circuits, ENGP 2010

Tulane University, Fall 2012: 56 undergraduates

Worked with the instructor to create homework and tests and graded both homework and exams. Provided regular office hours and oversaw 4 review sessions.

General Electric Curriculum Development and Teacher for GE Electric Girls

June 2017: 16 5th-7th Graders

Developed STEM curriculum and projects for introduction to circuits, programming, materials science physics, and chemistry for classroom instruction. Managed 16 students from 8am-3pm through daily educational activities.

Technical Writing Consultant

Louisiana Tech University Writing Center, May 2010-May 2012

Reviewed and suggested corrections for student documents: literature papers, technical manuals, scientific journal articles, and STEM dissertations.

Invited Presentations to the Community

1. "Girl Scout National Sports Day Career: STEM in Sports." to the Southeastern Girl Scouts at Tulane Yulman Stadium, February 3, 2018.
2. "Poster Presentations for Undergraduate Researchers." to Tulane Center for Learning and Teaching, March 5 & 8, 2017.
3. "Technical Communication: Connecting with the Audience." to Tulane Dept. of Pharmacology, May 16, 2016.
4. "Career Opportunities in STEM: Graduate Education." to Einstein Charter Middle School, March 8, 2016.

LEADERSHIP/SERVICE

Service to Tulane University

- 2018 NAE Grand Challenges Scholar Program Graduate Advisor for the new Tulane GCSP
- 2017 SSE Dean Search Committee

Service to the Tulane Graduate Community

Graduate and Professional Students Association

- 2016 GSSA Representative
Graduate and Professional Student Affairs Committee
University Senate Social Issues Committee
- 2015 SSE-GSSA Representative
Graduate and Professional Student Affairs Committee
University Senate Social Issues Committee

Graduate Student Studies Association

- 2016 GSSA President (managed budget of \$100k)
Graduate Council SSE Student Representative
- 2015 Graduate Council SSE Student Representative
Events Committee
Tulane Master Plan Graduate Committee
Biomedical Engineering Representative
- 2014 Events Committee
Biomedical Engineering Representative

Society of Women Engineers, National Member

- 2014-18 Graduate Student Mentor for Tulane University Section C066

Women+ in Science and Engineering at Tulane University

- 2018 Committee member: Mentorship & Outreach, Academic Development, Industry & Government
- 2016-17 Co-Founder of gender-identity inclusive group for graduate students and post-docs
Co-Chair, organized a graduate fellowship workshop and coordinated other activities for networking, mental wellness, and career development.

Service to K-12 Educators

- 2016 Assisted a workshop for 6th-12th grade science teachers on how to run local science fairs
Assisted with a Summer EV3 Workshop – instructed teachers on programming a EV3 Robot.
(1 week long and 2 individual 1 day long sessions were held.)
- 2015 Assisted two workshops for 6th-12th grade science teacher on how to run local science fairs

Service for K-12 Students

GE Girls – Summer Camp for 6th-8th grade students

- 2017 Designed hands-on STEM coursework, instructed 15 girls in STEM activities

The Perry Initiative – Biomedical Engineering and Orthopedic Workshops for High School Girls

- 2017 Graduate Volunteer Coordinator, Volunteer
- 2016 Graduate Volunteer Coordinator, Volunteer
- 2015 Advised girls as the only biomedical engineer present at the workshop

Greater New Orleans Science Fair

- 2018 Board Member - Helped organize fair set-up, grand-judging, evaluated project design
Webmaster - Communicated with awards committees to maintain current information
- 2017 Board Member - Helped organize fair set-up, grand-judging, evaluated project design
Webmaster - Communicated with awards committees to maintain current information
- 2016 Board Member- Helped organize fair set-up, grand-judging, evaluated project design
Webmaster, communicated with awards committees to maintain current information

Girls in STEM at Tulane (GiST)

Middle school girls from the Greater New Orleans participate in a day-long program to experience workshops on college life and academic research labs. Occurs once each Fall and Spring Semester

- 2018 Group leader and aided in registration of 250 girls
- 2017 One of 5 coordinators during the events and aided in registration of 250 girls
- 2016 One of 5 coordinators during the events and aided in registration of 250 girls
- 2015 One of 5 coordinators during the events and aided in registration of 175 girls
- 2014 One of 5 coordinators during the events and aided in registration of 120 girls
- 2013 Committee member for the development and organization of GiST
One of 5 coordinators during the events and aided in registration of 75 girls

Boys at Tulane in STEM (BaTS)

Middle school boys from the Greater New Orleans participate in a day-long program to experience workshops on college life and academic research labs. Occurs once each Fall and Spring Semester

- 2017 One of 5 coordinators during the events and aided in registration of 250 girls
- 2016 Committee member for the development and organization of BaTS
One of 5 coordinators during the events and aided in registration of 70 boys

FIRST Louisiana- Mississippi

A 100% volunteer run not-for-profit organization dedicated to the idea of building and bringing programs to enrich science and technology learning for the students of Louisiana and Mississippi

- 2017 Planning Committee Member
 - Surveyed potential sites for competitions, filled key volunteer roles, communicated monthly with committee planners
 - Organizes and manages a body of graduate students to help with promotional and educational events throughout the year
 - Contact person between the board and grad student volunteers
- 2016 Planning Committee Member
 - Surveyed potential sites for competitions, filled key volunteer roles, communicated monthly with committee planners
 - Organizes and manages a body of graduate students to help with promotional and educational events throughout the year
 - Contact person between the board and grad student volunteers
 - Helped run ASEE 2016 FIRST Curriculum Workshop for K-12 Teachers

- 2015 Planning Committee Member
Graduate Student Volunteer Coordinator
- Surveyed potential sites for competitions, filled key volunteer roles, communicated monthly with committee planners
 - Contact person between the board and student volunteers
- Technology Coordinator for 6 promotional and advisory events through the year
- 2013-2014 Tulane Student Representative to the Board and Planning Committee Member
- Surveyed potential sites for competitions, filled key volunteer roles, communicated monthly with committee planners

FIRST Robotics

- 2017 **Lego League** – Regional Championship Planning Committee and Referee
Graduate Student Coordinator (organized graduate students for assistance)
FIRST Robotics Competition- Bayou Regional Volunteer Registration Supervisor, Volunteer
- 2016 **Lego League** – Regional Championship Production Manager,
Graduate Student Coordinator (organized graduate students for assistance)
FIRST Robotics Competition- Bayou Regional Volunteer Registration Supervisor, Volunteer
- 2015 **Lego League** – Regional Championship Production Manager,
Graduate Student Coordinator (organized graduate students for assistance)
FIRST Robotics Competition- Bayou Regional Volunteer Registration Supervisor, Volunteer
- 2014 **Lego League** – Regional Championship Production Manager, Volunteer
- 2013 **Lego League** - Regional Championship Production Manager, Volunteer
FIRST Robotics Competition- Bayou Regional Volunteer
- 2012 **Lego League** - Regional Championship Volunteer