Elizabeth M. Walsh

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EDUCATION

Texas A&M University (TAMU), College Station, TX
Doctor of Philosophy in Entomology
Dissertation Title: The effects of in-hive pesticide exposure during development on honey bee (*Apis mellifera*, L.) queen reproduction, physiology, and worker behavior
Advisor: Dr. Juliana Rangel; GPA: 3.657 (4.0 scale); Aug 2014–Dec 2019

Ripon College, Ripon, WI
B. A. Biology (Honors), English (Honors), Minor in Secondary Education
Magna Cum Laude; 2010–2014

HONORS AND AWARDS

Texas A&M University Department of Entomology 2019
Outstanding Graduate Student Award

Graduate Student Forum (Texas A&M University) 2018
3rd place: Oral Presentation

American Association Professional Apiculturists 2017
Student Research Award

International Union for the Study of Social Insects 2017
LaFage Applied Research Award

*Entomological Society of America 2017
2nd Place: Oral Competition

Texas Apiary Inspection Service 2016
Advanced Master Beekeeper

National Science Foundation 2016
Honorable Mention: Graduate Research Fellowship

Texas Apiary Inspection Service 2016
Advanced Master Beekeeper

United States Department of Agriculture 2016
Diversity Student Program

Texas Beekeepers Association 2015
Graduate Student Research Award

**Entomological Society of America 2015
2nd Place: Oral Competition

National Science Foundation 2015
Honorable Mention: Graduate Research Fellowship

Texas Apiary Inspection Service 2015
Apprentice Master Beekeeper

***Ecological Integration Symposium, 2015

2nd Place: Oral Competition

Alltech Agricultural Science Company 2015
Young Scientist Award

****Foundation for the Preservation of Honey Bees 2014
Foundation Scholar

National Honor Society in Biology (Beta Beta Beta) 2014-Present

National Honor Society in English (Sigma Tau Delta) 2012-Present

GRANTS

USDA-AFRI Postdoctoral Fellowship ($165,000) Pending
(With Dr. Jay Evans of USDA-Beltsville)

North American Pollinator Protection Campaign ($10,000) 2019

California State Beekeepers Association ($10,000) 2014
Honey Bee Health Research Grant, co-authored

National Science Foundation ($1,500) 2013
Undergraduate Student Travel Grant

SCHOLARSHIPS

NSF-Close the Gap Fellowship, TX A&M University 2017

Student Scholarship, Texas Beekeeper's Association 2015

Herb Dean '40 Endowed Scholarship, TX A&M University 2015

Graduate Excellence Fellowship, TX A&M University 2014

PEER-REVIEWED PUBLICATIONS

E. M. Walsh, O. Khan, J. Grunseich, A. Helms, N. Ing, and J. Rangel. Queen honey bee (*Apis mellifera*) exposure to pesticides during development does not affect immature feeding rates, brood pheromones, or adult morphology. *Pending submission to* Apidologie, *expected submission is in the February of 2020*.

E. M. Walsh, M. Janowiecki, K. Zhu, N. Ing, E. Vargo, and J. Rangel. Honey bee (*Apis mellifera*, L.) queens exhibit elevated mating frequencies when exposed to miticides, but not agricultural pesticides, during development. *Submitted for an invited research article for a special issue of* Annals of the Entomological Society of America.

E. M. Walsh, S. Sweet, A. Knap, N. Ing, and J. Rangel. Honey bee (*Apis mellifera*) queen pheromones and reproductive behavior are affected by pesticide exposure during development. Behav. Ecol. Sociobiol. 73: 38 doi: 10.1007/s00265-019-2647-2

A. N. Payne, **E.M. Walsh*,** and J. Rangel. 2019. Initial exposure of wax foundation to agrochemicals causes negligible effects on the growth and winter survival of incipient

honey bee (*Apis mellifera*) colonies. Insects. doi:10.3390/insects10010019 (*Walsh and Payne co-first authors)

POPULAR PUBLICATIONS

E.M. Walsh and J. Rangel. 2018. Extracting honey bee (*Apis mellifera*, L.) queen mandibular glands: Methodology for dissection and preparation. *Bee World*. 95 (1): 3-5. DOI: 10.1080/0005772X.2017.1373511.

E.M. Walsh and J. Rangel. 2016. Local honey bee queen production and quality. *Bee World*. 93 (2): 30-32. DOI: 10.1080/0005772X.2016.1211501.

A. Fisher II, **E.M. Walsh** and L. Ward. 2015. Catch the buzz—a bunch of ways to keep honey bees away from your outdoor meals. *Bee Culture*. https://www.beeculture.com/catch-the-buzz-a-bunch-of-ways-to-keep-honey-bees-away-from-your-outdoor-meals/

Monthly columnist for the Kelley Beekeeping Newsletter from 2016-2018, for a total of 18 articles. This is a free online newsletter with approximately 60,000 subscribers worldwide.

PUBLISHED ABSTRACTS

E.M. Walsh and Juliana Rangel. The effects of pesticides on honey bee (*Apis mellifera* L.) queen reproductive physiology and behavior. *Bee World.* 93 (4). 2 March, 2017. http:dx.doi.org/10.1080/0005772X.2017.1294471

E.M. Walsh and Juliana Rangel. Synergistic effects of acaricides used to control the ectoparasitic mite *Varroa destructor* on the reproductive health of honey bee (*Apis mellifera*) queens. 29 September, 2016. DOI: 10.1603/ICE.2016.112977

PRESENTATIONS AND POSTERS

E.M. Walsh. The effects of pesticides on honey bee queen health. CO State Beekeepers Association. 2 November, 2019.

E.M. Walsh. Integrated Pest Management: Myths, History, and Practice. Keynote speaker. CO State Beekeepers Association. 2 November, 2019.

E.M. Walsh, Mark Janowiecki, Edward Vargo, and Juliana Rangel. The effects of agrochemicals on honey bee (*Apis mellifera*) queen mating frequency and sperm viability. Student presentations. American Bee Research Conference. Tempe, Arizona. 11 January, 2019.

E.M. Walsh, Mark Janowiecki, Edward Vargo, and Juliana Rangel. Effects of pesticide exposure during development on the mating frequency of honey bee (*Apis mellifera*, L.) queens. Student competitor. Entomological Society of America. Vancouver, Canada. 12 November, 2018.

E.M. Walsh, Stephen Sweet, Anthony Knap, and Juliana Rangel. The impact of in-hive pesticides on honey bee (*Apis mellifera*, L.) queen behavior and physiology. Invited presenter. IONs at Work. College Station, TX. 5 October, 2018.

***E.M. Walsh,** Mark Janowiecki, Edward Vargo, Stephen Sweet, and Juliana Rangel. Honey bee (*Apis mellifera* L.) queen rearing environment affects behavior and physiology. Student competitor. Entomological Society of America. Denver, CO. 6 November, 2017.
E.M. Walsh and Juliana Rangel. The effects of pesticides on honey bee (*Apis mellifera,* L.) queen reproductive physiology and behavior. Student competitor. Ecological Integration Society. College Station, TX. 24 March, 2017.
E.M. Walsh and Juliana Rangel. The effects of pesticides on honey bee (*Apis mellifera,*L.) queen reproductive physiology and behavior. Student competitor. Association of American Professional Apiculturalists and American Beekeeping Federation meeting. Galveston, TX. 13 January, 2017.
E.M. Walsh and Juliana Rangel. The effects of agrochemicals on the reproductive health of honey bee (*Apis mellifera*) queens. Texas Beekeepers Association's annual meeting. Belton, TX. 4 November, 2016.
E.M. Walsh and Juliana Rangel. The effects of agrochemicals on the reproductive health of honey bee (*Apis mellifera*) queens. Student competitor. SEX in the post-genomic era. College Station, TX. 10 October, 2016.
E.M. Walsh and Juliana Rangel. Synergistic effects of acaricides used to control the ectoparasitic mite *Varroa destructor* on the reproductive health of honey bee *(Apis mellifera* L.) queens. Invited speaker in the Acarology symposium. International Congress of Entomology. Orlando, FL. 29 September, 2016.
E.M. Walsh. IPM and IPC: Why it matters to "US" rather than "YOU". Invited speaker. Williamson County Beekeepers Association Meeting. 26 May, 2016.
E.M. Walsh. Queen quality and rearing. Invited speaker. Williamson County Beekeepers Association Meeting. 26 May, 2016.
E.M. Walsh and Juliana Rangel**.** The synergistic effects of in-hive miticides on honey bee (*Apis mellifera*) queen retinue and mandibular glands. Student competitor. Ecological Integration Symposium at TAMU. 1 April, 2016.
E.M. Walsh and Juliana Rangel**.** The effects of miticides on honey bee queens: are we sabotaging ourselves?. Speaker. American Beekeepers Association. Jacksonville, FL. 8 January, 2016.
E.M. Walsh and Juliana Rangel**.** 2016. The synergistic effects of in-hive miticides on honey bee (*Apis mellifera* L.) queens. Student competitor. American Association of Professional Apiculturists. Jacksonville, FL. 8 January, 2016.
****E.M. Walsh** and Juliana Rangel**.** The effects of in-hive miticides on honey bee (*Apis mellifera* L.) queen mandibular pheromones. Student competitor. Entomological Society of America's annual meeting. Minneapolis, MN. 9 November, 2015.
E.M. Walsh. Foundation for the Preservation of Honey Bees (FPHB) scholar presentation. Invited speaker. Wisconsin Honey Producer's Association. Steven's Point, WI. 7 November, 2015.
E.M. Walsh and Juliana Rangel**.** The effects of in-hive miticides on honey bee (*Apis mellifera* L.) mature queens. Invited speaker. Wisconsin Honey Producer's Association. Steven's Point, WI. 6 November, 2015.
*****E.M. Walsh** and Juliana Rangel. The effects of in-hive miticides on honey bee (*Apis mellifera*) queen retinue and mandibular glands. Student competitor. Ecological Integration Symposium at TAMU, College Station, TX. 26 March, 2015

E.M. Walsh and Juliana Rangel. The effects of in-hive miticides on honey bee (*Apis mellifera*) queen retinue and mandibular glands. Student competitor. Student Research Week at TAMU, College Station, TX. 27 March, 2015.
E.M. Walsh. Introduction to Queen Rearing. Invited speaker. Williamson County Beekeepers Association Meeting. 21 January, 2015.
******E.M. Walsh** and Juliana Rangel. The effects of in-hive miticides on honey bee (*Apis mellifera*) queen retinue and mandibular glands. Invited student. American Beekeeping Federation's Annual Meeting. Anaheim, CA. 9 January, 2015.
E.M. Walsh. The effects of in-hive miticides on honey bee (*Apis mellifera*) queens. Invited speaker. Southeastern Wisconsin Honey Producers Annual Meeting. 5 November, 2014.
E. M. Walsh. The effects of in-hive miticides on honey bee (*Apis mellifera*) queens. Invited speaker. South-Central Wisconsin Honey Producers Annual Meeting. 10 July, 2013.
E. M. Walsh and Juliana Rangel-Posada. The effects of in-hive miticides on honey bee (*Apis mellifera*) queen retinue response. Student competition. Presented at the Entomological Society of America's annual meeting. 2013.
E. M. Walsh. Feral Africanized honey bee hunting in Southern Texas. Invited speaker. Dodge/Jefferson Beekeeping Club Meeting. 2013.

PROFESSIONAL AFFILIATIONS

Society of Environment Toxicology and Chemistry, TX A&M University	2015-16
Williamson County Area's Beekeeping Association, TX	2014-17
Texas Beekeepers Association, TX	2014-Present
Entomology Graduate Student Organization, TX A&M University	2014-Present
Entomological Society of America	2013-Present
Wisconsin Honey Producers Association, WI	2009-Present
East Central Beekeepers Association, WI	2010-Present
Dodge/Jefferson County Beekeeping Club, WI	2010-2014

SERVICE

Volunteer, STEM Night, TX A&M High School	2017
Monthly columnist, XYZ of Beekeeping, *Kelley Online Newsletter*	2015-2017
Volunteer, Wish Upon a Butterfly, Brazos Natural History Museum	2014, 2015
VP and founder, Soc. of Env. Toxicology and Chemistry, TAMU Chapter	2015
Seminar Chair, Entomology Graduate Student Organization of TAMU	2015-2017
Volunteer, Insect Expo, Entomological Society of America	2015
Volunteer, Green Prairie STEM Night, Green Prairie Elementary School	2014
Volunteer, Boonville Days, Brazos Natural History Museum	2014, 15, 16
Outreach Coordinator, East Central Wisconsin Beekeepers Association	2012-2014
Beekeeping Chair, Environmental Club of Ripon	2010-2014
Honey Queen, Dodge/Jefferson Beekeepers Club	2010-2012
Beekeeping Mentor, Wisconsin 4-H Association	2009-2014

GUEST LECTURER

Speaker, "Bee School," Brazos Valley Beekeepers, TAMU	2017-2019
Instructor, "Art of Queen Rearing," Rangel Honey Bee Lab, TAMU	2015-2019
Instructor, "Bee School," Austin Annual Bee School	2015-2017

Instructor, "Annual Bee School," Central TX Beekeepers 2015-2019
Instructor, "Summer Clinic," Texas Beekeepers Association 2015-2019
Speaker, Walworth County Bee Club, WI July 2016
Speaker, Williamson County Beekeepers Association May 2016
Speaker, Annual Meeting, American Beekeeping Federation January 2015,16
Speaker, Summer Meeting, Wisconsin Honey Producers Association November 2015
Speaker, Williamson County Beekeepers Association October 2015
Keynote Speaker, Harris County Beekeepers October 2015
Speaker, Walworth County Bee Club, WI June 2015

PROFESSIONAL WORK EXPERIENCE

Texas A&M University, Entomology Department—College Station, TX

Graduate Research Assistant 2014-2019

"The Effects of In-Hive Miticides on Honey Bee (*Apis mellifera*) Queens"
Helped care for 40-80 honey bee colonies, authored successful grant proposals, and authored peer-reviewed research while researching, teaching, and taking classes.

Teaching Assistant

ENTO 320 (online): Honey bee biology Fall 2019
Instructor: Dr. Tonya Shepherd, 250 students
ENTO 320 (online): Honey bee biology Spring 2019
Instructor: Dr. Tonya Shepherd, 203 students
ENTO 320 (online): Honey bee biology Summer 2019
Instructor: Dr. Tonya Shepherd, 157 students
ENTO 320 (online and in-person): Honey bee biology Spring 2019
Instructor: Dr. Tonya Shepherd, 241 students
ENTO 320 (online and in-person): Honey bee biology Fall 2018
Instructor: Dr. Tonya Shepherd, ~260 students
ENTO 320 (online): Honey bee biology Spring 2018
Instructor: Dr. Tonya Shepherd, 140 students
ENTO 321: Beekeeping Laboratory Spring 2018
Instructor: Dr. Juliana Rangel, 14 students
ENTO 320 (online): Honey bee biology Fall 2017
Instructor: Dr. Tonya Shepherd, 100 students
ENTO 320 (online): Honey bee biology Spring 2017
Instructor: Ms. Ashley Jones, 100 students
ENTO 320: Honey bee biology Fall 2016
Instructor: Dr. Juliana Rangel, 31 students
ENTO 320 (online): Honey bee biology Fall 2016
Instructor: Ms. Lauren Ward, 88 students
ENTO 401: Principles of integrated pest management Fall 2016
Instructor: Dr. Raul Medina, 18 students

Research Experience for Undergraduates (NSF) Summer 2013

Title of project: The effects of in-hive miticides on honey bee (*Apis mellifera*) queen retinue behavior

Dadant and Sons Beekeeping Supplies—Watertown, WI 2010-2014
Answered new beekeepers' questions, assisted in package bee selling and care

Queen B Honey 2009-2017
Owner, founder, and beekeeper

REFERENCES

Academic (graduate; Texas A&M University)

Juliana Rangel
Associate Professor of Apiculture
Department of Entomology and
Interdisciplinary Program in Ecology and Evolutionary Biology
Texas A&M University
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College Station, TX 77843-2475
Tel. 979.845.1074; Fax 979.845.6305
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Website: http://honeybee.tamu.edu

Edward Vargo
Professor and Endowed Chair in Urban and Structural Entomology
Department of Entomology
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Skype: ed.vargo
Web page: http://urbanentomology.tamu.edu/

Nancy Ing, DVM, PhD
Professor
Department of Animal Science, Genetics, and Veterinary Medicine
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College Station, TX 77843-2471
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Tel.: 979-862-2790; Fax.: 979-862-3399
http://animalscience.tamu.edu/ning/lab/

Academic (undergraduate; Ripon College)

Dr. Robert Wallace
Retired Professor
Department of Biology
Ripon College
300 W. Seward St.
Ripon, WI 54971
Email: wallacer@ripon.edu (preferred method of contact)
920.748.8115

Beekeeping

Lee Heine
Retired manager and former member of the National Honey Board
Dadant & Sons Beekeeping Supplies, Watertown, WI branch
Email: leeheine500@gmail.com
608.434.2339 (preferred method of contact)

Jonathan Walker
Generational Texan migratory beekeeper
Email: jwalker8811@gmail.com (preferred method of contact)
254.721.3049