

# Laura E. Tibbs-Cortes

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## Education

**Iowa State University**, Ames, IA

Ph.D., Genetics and Genomics

Minor: Statistics

Advisor: Dr. Jianming Yu, Department of Agronomy

*Aug. 2017 – Sep. 2022 (projected)*

**Benedictine College**, Atchison, KS

B.A., *summa cum laude*

Major: Biology Minor: Chemistry

*Aug. 2013 – May 2017*

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## Research Experience

**Ph.D. Dissertation Research**

*Iowa State University, Ames, IA*

- Conducted GWAS, TWAS, and genomic prediction with large data sets (20 million markers, 4500 taxa)
- Identified loci and environmental variables underlying phenotypic plasticity in maize; leveraged to predict new genotypes in new environments
- Established data processing pipeline for microbiome data collected by 16S rRNA gene amplicon sequencing
- Wrote R and Bash scripts to run analyses on High Performance Computing clusters

*Mar. 2018 – Present*

**Science Undergraduate Laboratory Intern (SULI)**

*Iowa State University, Ames, IA*

- Programmed and wired Arduino boards to control growth chamber environment
- Grew, phenotyped, and harvested plants in growth chambers
- Used FreeCAD to design and 3D printing to produce a scalable plant growth environment

*May 2016 – Aug. 2016*

**Research Experience for Undergraduates (REU) Intern**

*Iowa State University, Ames, IA*

- Collected vertically stratified moss and lichen samples from trees using doubled rope climbing technique (DRT)
- Wrote manuscript for peer-reviewed journal and presented results to the public

*Jun. 2015 – Aug. 2015*

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**USDA-ARS Pathways Intern, Biology**

*May 2014 – Aug. 2014*

*National Laboratory for Agriculture and the Environment, Ames, IA*

- Installed and maintained water samplers and experimental treatments at field sites
  - Collected and processed samples, designed and built apparatus to automate sample filtering
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**Teaching and Outreach Experience**

**Guest Lecturer**

- BIO 186: Microbiology Laboratory *May 2021*  
*Des Moines Area Community College, Ankeny, IA*
- BIOL-1121: General Biology I Laboratory *Oct. 2020*  
*Benedictine College, Atchison, KS*
- EEOB 561: Evolutionary and Ecological Genomics *Feb. 2020*  
*Iowa State University, Ames, IA*

**Genetics, Agriculture, and Biotechnology Teaching Assistant**

*Jan. 2019 – May 2020*

*Iowa State University, Ames, IA*

- Transitioned face-to-face course to online delivery by reformatting lectures, assignments, and exams
- Developed course materials and assessments and taught 5-7 class sessions each semester
- Clarified content and provided constructive feedback to students in person and via email

**Extension Intern**

*May 2017 – Aug. 2017*

*Hardin County Extension Office, Iowa Falls, IA*

- Developed automated, computerized methods to accomplish previously manual annual tasks and developed detailed written instructions for future use
- Prepared and presented an educational session for seniors, a workshop for elementary students, and educational activities for a K-3 grade day camp

**Biology Tutor and Laboratory Teaching Assistant**

*Aug. 2014 – May 2017*

*Benedictine College, Atchison, KS*

- Instructed both biology majors and non-science majors in course content and laboratory techniques
  - Courses taught: Bi 107: Principles of Biology (five semesters), Ch 105: General Chemistry I Laboratory (two semesters), and Bi 121: General Biology I (one semester)
  - Tutored for courses including Bi 121: General Biology I, Bi 122: General Biology II, Bi 107: Principles of Biology, Bi 355: Ecology, Bi 370: Genetics, and Bi 360: Microbiology.
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## Publications

- Tibbs-Cortes, L.E.**, Guo, T., Li, X., Tanaka, R., Vanous, A.E., Peters, D., Gardner, C., Magallanes-Lundback, M., Deason, N.T., DellaPenna, D., Gore, M.A., & Yu, J. (in review). Genomic prediction of tocochromanols in exotic-derived maize. *The Plant Genome*.
- Tibbs-Cortes, L.E.**, Tibbs-Cortes, B.W. & Schmitz-Esser, S. (2022). Tardigrade community microbiomes in North American orchards include putative endosymbionts and plant pathogens. *Frontiers in Microbiology*, 13, 866930. <https://doi.org/10.3389/fmicb.2022.866930>
- Wu, D., Li, X., Tanaka, R., Wood, J.C., **Tibbs-Cortes, L.E.**, Magallanes-Lundback, M., Bornowski, N., Hamilton, J.P., Vaillancourt, B., Diepenbrock, C.H., Li, X., Deason, N.T., Schoenbaum, G.R., Yu, J., Buell, C.R., DellaPenna, D., & Gore, M.A. (2022). Combining GWAS and TWAS to identify candidate causal genes for tocochromanol levels in maize grain. *Genetics*, iyac091. <https://doi.org/10.1093/genetics/iyac091>
- Li, X., Guo, T., Wang, J., Bekele, W., Sukumaran, S., Vanous, A., McNellie, J., **Tibbs-Cortes, L.**, Da Silva, M., Lamkey, K., Westgate, M., McKay, J., Archontoulis, S., Reynolds, M., Tinker, N., Schnable, P., & Yu, J. (2021). An integrated framework reinstating the environmental dimension for GWAS and genomic selection in crops. *Molecular Plant*, 14(6), 874-887. <https://doi.org/10.1016/j.molp.2021.03.010>
- Tibbs-Cortes, L.**, Zhang, Z., & Yu, J. (2021). Status and prospects of genome-wide association studies in plants. *The Plant Genome*, 14, e20077. <https://doi.org/10.1002/tpg2.20077>
- Highlighted in: Past, present, and future of genome-wide association studies. *CSA News*, 66(6), 22. <https://doi.org/10.1002/csan.20465>
- Chen, Y., **Tibbs-Cortes, L.E.**, Ashley, C., Putz, A.M., Lim, K.-S., Dyck, M.K., ... & PigGen Canada. (2020). The genetic basis of natural antibody titers of young healthy pigs and relationships with disease resilience. *BMC Genomics*, 21, 648. <https://doi.org/10.1186/s12864-020-06994-0>
- Tibbs-Cortes, L. E.**, Tibbs-Cortes, B.W., & Miller, W.R. (2020). Tardigrades of Hardin County, Iowa: Seven new records from Iowa, USA. *Transactions of the Kansas Academy of Science*, 123(1–2), 203–212. <https://doi.org/10.1660/062.123.0117>
- Chen, Y., **Tibbs, L.**, Ashley, C., Putz, A.M., Lim, K.-S., Dyck, M., ... & Harding, J.C.S. (2019). 59 The genetic basis of natural antibody titers and relationships with disease resilience in pigs [Abstract]. *Journal of Animal Science*, 97(Supplement\_2), 35–36. <https://doi.org/10.1093/jas/skz122.065>
- Chen, Y., **Tibbs, L.E.**, Ashley, C., Putz, A.M., Lim, K.-S., Dyck, M.K., ... & Harding, J.C.S. (2019). The genetic basis of natural antibody titers and relationships with disease resilience in pigs. *Animal Industry Report*, R3344. <https://www.iastatedigitalpress.com/air/article/id/7204/>
- Tibbs, L. E.**, Ashley, C., Putz, A., Lim, K.-S., & Dyck, M. K. (2018). Selection for increased natural antibody levels to improve disease resilience in pigs. *Animal Industry Report*, 664. [https://doi.org/10.31274/ans\\_air-180814-285](https://doi.org/10.31274/ans_air-180814-285)
- Moore, A., West, M., **Tibbs, L.**, Cortes, B.W., Miller, W.R., Johansson, C., & Lowman, M.D. (2018). Tardigrades of the canopy: A new genus for *Acanthechiniscus goedeni* (Heterotardigrada: Echiniscoidea: Echiniscidae) from Oregon, USA [Abstract]. *Transactions of the Kansas Academy of Science*, 121(1–2). <https://doi.org/10.1660/062.121.0226>

- Tibbs, L. E.,** Cortes, B. W., & Miller, W. R. (2016). Tardigrades in the canopy: The dilemma between the genera *Itaquascon* and *Astatumen* [Abstract]. Transactions of the Kansas Academy of Science, 119(2), 263. <https://doi.org/10.1660/062.119.0217>
- Tibbs, L. E.,** Emanuels, A., & Miller, W. R. (2016). Tardigrades of the canopy: Argentine species *Milnesium beatae* Roszkowska, Ostrowska and Kaczmarek, 2015 (Eutardigrada, Milnesidae) discovered in the trees of Kansas, U.S.A. Transactions of the Kansas Academy of Science, 119(2), 173–178. <https://doi.org/10.1660/062.119.0207>

## Professional Presentations

### Oral Presentations:

- Tibbs-Cortes, L.E.** PhD Research Summary. *Corteva PhD Student Seminar*; virtual, June 23, 2022.
- Tibbs-Cortes, L.E.,** Tibbs-Cortes, B.W., & Schmitz-Esser, S. Tardigrade microbiomes in North American orchards. *2<sup>nd</sup> Annual G3 Symposium*; Ames, IA; April 15, 2022.
- Tibbs-Cortes, L.E.,** Li, X., Guo, T. & Yu, J. Environmental and genetic determinants of phenotypic plasticity in the maize NAM population. *9th Annual R.F. Baker Plant Breeding Symposium*; Ames, IA; March 25, 2022.
- Tibbs-Cortes, L.E.,** Li, X., Guo, T., & Yu, J. Environmental and genetic factors underlying phenotypic plasticity in maize. *International Plant & Animal Genome Conference XXIX*, virtual, Jan. 8, 2022.
- Tibbs-Cortes, L.,** Zhang, Z., & Yu, J. Genome-wide association studies in crops. *9th Annual Graduate and Professional Student Research Conference*, virtual, Apr. 9, 2021.
- Tibbs-Cortes, L.,** Li, X., Guo, T., & Yu, J. Identifying environmental and genetic factors underlying phenotype in the maize NAM population. *63rd Annual Maize Genetics Meeting*; virtual, Mar. 8-12, 2021.
- Tibbs-Cortes, L.,** Zhiwu, Z, DellaPenna, D., Gore, M., Buell, C.R., & Yu, J. Challenges and opportunities in genome-wide association studies. *2021 Corn Breeding Research Annual Meeting*, virtual, Feb. 18, 20, 25, & 27, 2021.
- Tibbs, L.,** Cortes, B.W., & Miller, W. Tardigrades of the canopy: The dilemma between the genera *Itaquascon* and *Astatumen*. *148<sup>th</sup> Annual Meeting of the Kansas Academy of Science*, McPherson, KS, Apr. 1-2, 2016.
- Tibbs, L.,** Cortes, B., & Miller, W. Tardigrades of Hardin County, Iowa. *129th Annual Meeting of the Iowa Academy of Science*, Cedar Falls, IA, Apr. 21-22, 2017.

### Poster Presentations:

- Tibbs-Cortes, L.E.,** Tibbs-Cortes, B.W., & Schmitz-Esser, S. Tardigrade community microbiomes in North American orchards include putative endosymbionts and plant pathogens. *2<sup>nd</sup> Annual G3 Symposium*; Ames, IA; April 15, 2022.
- Tibbs-Cortes, L.E.,** Li, X., Guo, T., & Yu, J. Dissecting environmental and genetic determinants of phenotypic plasticity in the maize NAM population. *8th Annual Graduate and Professional Student Research Conference*; April 6, 2022; Ames, IA.

- Tibbs-Cortes, L.E.,** Li, X., Guo, T. & Yu, J. Environmental and genetic basis of phenotypic plasticity in the maize NAM population. *64<sup>th</sup> Annual Maize Genetics Meeting*; St. Louis, MO; Mar. 31-Apr. 3, 2022.
- Tibbs-Cortes, L.E.,** Li, X., Guo, T. & Yu, J. Environmental and genetic determinants of phenotypic plasticity in the maize NAM population. *9<sup>th</sup> Annual R.F. Baker Plant Breeding Symposium*; Ames, IA; Mar. 25, 2022.
- Tibbs-Cortes, L.E.,** Li, X., Guo, T. & Yu, J. Environmental and genetic factors underlying phenotypic plasticity in the maize NAM population. *International Plant & Animal Genome Conference XXIX*, virtual, Jan. 7-12, 2022.
- Tibbs-Cortes, L.,** Li, X., Wu, D., Wood, J., Guo, T., Li, X., Tanaka, R., Albert, E., Bao, Y., Schoenbaum, G., Deason, N., Magallanes-Lundback, M., Buell, C.R., DellaPenna, D., Gore, M., & Yu, J. Genome-wide dissection of B vitamin levels in maize grain in the Ames diversity panel. *National Association of Plant Breeders 2020 Annual Meeting*, virtual, Aug. 16-20, 2020.
- Tibbs, L.,** Li, X., Wu, D., Wood, J., Guo, T., Li, X., Tanaka, R., Albert, E., Bao, Y., Schoenbaum, G., Deason, N., Magallanes-Lundback, M., Buell, C.R., DellaPenna, D., Gore, M., & Yu, J. Genome-wide dissection of B<sub>1</sub> and B<sub>3</sub> vitamin levels in maize grain in the Ames diversity panel.
- *62<sup>nd</sup> Annual Maize Genetics Conference*, virtual, Jun. 25-26, 2020.
  - *7<sup>th</sup> Annual Graduate and Professional Student Research Conference*, virtual, Apr. 10, 2020.
  - *7<sup>th</sup> Annual R.F. Baker Plant Breeding Symposium*, Ames, IA, Mar. 6, 2020.
- Tibbs, L.,** Dziewit, M., Guo, T., Li, X., Wu, D., Albert, E., Bao, Y., Schoenbaum, G., Magallanes-Lundback, M., Buell, C. R., Gore, M., DellaPenna, D., & Yu, J. Genome-wide association studies of B vitamin levels in maize grain using 16.7 million imputed SNPs.
- *6<sup>th</sup> Annual Graduate and Professional Student Research Conference*, Ames, IA, Apr. 10, 2019.
  - *61<sup>st</sup> Annual Maize Genetics Conference*, St. Louis, MO, Mar. 14 - 17, 2019.
  - *6<sup>th</sup> Annual R.F. Baker Plant Breeding Symposium*, Ames, IA, Mar. 1, 2019.
- Tibbs, L.,** Ashley, C., Putz, A., Lim, K., Dyck, M.K., Fontin, F., Plastow, G.S., PigGen Canada, Dekkers, J., & Harding, John C.S. Selection for increased natural antibody levels to improve disease resilience in pigs.
- *Interdepartmental Research Showcase*, Ames, IA, Oct. 17, 2018.
  - *Plant and Animal Genome XXVI Conference*, San Diego, CA, Jan. 13-17, 2018.

### **Selected Awards and Professional Development**

- C. R. Weber Award for Excellence in Plant Breeding *2021*
  - Iowa Mentored Community College Teaching Practicum *2021*
  - Graduate presentation award, GPSS Research Conference *2020, 2021*
  - Graduate College Teaching Excellence Award in Agronomy *2020*
  - Preparing Future Faculty (PFF) Associate *2020*
  - Center for Integration of Research, Teaching, and Learning (CIRTL) Associate *2020*
  - Project LEA/RN Workshop: Intro to Learning-Centered Classes and Meetings *2020*
  - AAAS/Science Program for Excellence in Science Award *2017*
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### **Selected Grants and Fellowships**

- National Science Foundation Graduate Research Fellowship (NSF GRFP) *2017 – 2022*
  - Ted Crosbie Monsanto Graduate Scholarship in Corn Breeding *2019, 2020*
  - Josef F. Schuler Fellowship in Agronomy *2019*
  - Iowa State University Presidential Fellowship *2017 – 2018*
  - Benedictine College Research Grants *2013, 2014, 2015*
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### **Selected Service**

- R.F. Baker Plant Breeding Symposium
  - Speaker Committee *2018 – 2019*
  - Speaker Committee Chair *2019 – 2020*
  - Poster Chair *2021 – 2022*
- World Food Prize Youth Institute *2021*
- Iowa State Science and Technology Fair judge *2018, 2019, 2021*
- Treasurer, Agronomy Graduate Student Organization *2019*
- Borlaug Inspire Day *2019*
- Secretary, Interdepartmental Graduate Group *2018*