

**Hannah Rae Thomas**  
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**HannahRaeThomas.com**

**Education**

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**Doctor of Philosophy in Plant Biology | USDA NIFA Predoctoral Fellow** **Expected 2022**  
**Cornell University**, Ithaca, NY  
GPA: 3.9 | Courses of Interest: Science Policy, Plant Biochemistry, Quantitative Genetics, Python

**Bachelor of Science in Biology** **July 2017**  
**Pittsburg State University**, Pittsburg, KS  
Minor: Chemistry | Emphasis: Molecular plant biology and plant physiology  
GPA: 3.98 | Credits: 156 | Summa Cum Laude

**Research Experience**

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**Cornell University**, PhD Candidate and USDA AFRI-NIFA Predoctoral Fellow **7/2018-Current**  
School of Integrative Plant Science, Laboratory of Dr. Margaret Frank  
Thesis: *Understanding the Role of Intercellular Communication in Vegetable Crop Grafting*  
**Focus:** plant grafting, histology and microscopy, plant transformation, and biotechnology

**Boyce Thompson Institute and Cornell University**, PhD Intern **1/2018-6/2018**  
School of Integrative Plant Science, Laboratory of Dr. Joyce Van Eck  
Project: *Formal training on Solanaceous plant transformation and tissue culture*  
**Focus:** Plant transformation and tissue culture

**Boyce Thompson Institute and Cornell University**, PhD Intern **8/2017-12/2017**  
School of Integrative Plant Science, Dr. James Giovanonni,  
Project Title: *Gene expression in Coffea arabica fruit development*  
**Focus:** Genomics and bioinformatics

**Donald Danforth Plant Science Center**, Undergraduate Research Assistant (NSF REU) **5/2016-8/2016**  
Laboratory of Dr. Blake Meyers  
Project Title: *Functional analysis of phasiRNA in soybean anthers*  
**Focus:** Small RNAs

**Pittsburg State University** Undergraduate Research Assistant **1/2016-7/2017**  
Department of Biology, Laboratory of Dr. Virginia Rider  
Thesis title: *The spatial expression of the T cell homing receptor, CCR7 and T cells marker, FoxP3 are differentially regulated by progesterone and estradiol in the rat uterus*  
**Focus:** proteomics and immunohistochemistry

**Relevant Experience**

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**Associate Editor** **05/2021-Current**  
Journal of Science Policy and Governance  

- <10 hours/week
- Curated and edited issues of the JSPG during the 2021-2022 school year

**Instructor/Research Writer** **10/20120-Current**  
Garden Streets | Gardenstreets.com  

- 10 hours/week
- Taught over 200 plant science classes to employees from corporations like Starbucks, Google, LinkedIn etc.
- Wrote weekly informative blog posts covering broad subjects of plant science
- Assisted CEO with white papers

**Undergraduate Mentor** **01/2019-Current**  

- 15 hours/week.
- Mentored 4 Cornell University undergraduates, 1 NSF REU summer intern, and 1 high school student

**Graduate Teaching and Research** **8/2018-Current**  
College of Agriculture and Life Sciences | Cornell University  

- 40 hours/week
- Taught 3 courses: Field Crop Systems, Plant Physiology, Introduction to Plant Diversity and Evolution

## Lab and Website Manager.

06/2018-Current

Margaret Frank | Cornell University

- <10 hours/week
- In charge maintaining and cultivating content the Frank Lab Website
- Designed and maintains the Frank Lab Website including Search Engine Optimization (SEO).

## Grants and Awards

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United States Department of Agriculture AFRI-NIFA Predoctoral Fellow (PI: Hannah Thomas) <i>Understanding the Role of Intercellular Communication in Vegetable Crop Grafting</i> (\$179,999)	2019-current
Cornell Institute for Digital Agriculture Research Innovation Fund <i>Plant vein detection through machine learning and computer vision</i> (\$9,500)	2018
American Society of Plant Biology (ASPB) <i>Convivon Scholar</i>	2018
Selected as an American Society of Plant Biologists (ASPB) Convivon Scholar, a program for promising young plant scientists	2018
Kansas IDeA Network of Biomedical Research Excellence (K-INBRE) <i>The spatial expression of the T cell homing receptor, CCR7 and T cells marker, FoxP3 are differentially regulated by progesterone and estradiol in the rat uterus</i> (\$4,000)	2016

## Leadership

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Executive Member of Advancing Science and Policy (ASAP) organization at Cornell, Chair of the Federal Advocacy Program	2020-current
Plant Biology Graduate Student Association Treasurer	2018-2019
Founding member at Pittsburg State University Curation Collection Club, an organization that spread awareness about the natural history collections, including cataloging, fundraising, and geo-referencing specimens. Elected secretary in 2015 and vice-president in 2016.	2016-2017
Selected as a member of the Pittsburg State University Honors College Association and awarded a \$20,000 scholarship based on academic merit (2013). Elected class representative 2013-2016.	2013-2017

## Outreach and Enrichment

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### Education

- Designed original science curriculum implemented by the cities of Ithaca, NY and Freeville, NY school districts during COVID-19 related school closures
  - Sent plant science kits to 2000 elementary school students
  - In collaboration with Ithaca Children's Garden, designed and distributed information on gardening and plant science to hundreds of local families
- Volunteered 15 hours/week as an instructor at the Free Science Workshop. The FSW is a free, open door workshop for minority and low-income kids in the Ithaca area (2018-2019)
- Worked as an Alliance for Science Instructional Volunteer where I demonstrated and led a DNA extraction lab with a visiting Training Team from Africa and Asia (2018)
- Volunteered with Expanding Your Horizons, all-day science workshop at Cornell University designed to allow young women and girls (K-12) the chance to explore STEAM (2018)
- Teach plant science classes through Garden Streets, a company working to connect Corporate America with nature.
  - Hosted classes with companies such as: Google, Facebook, Starbucks, LinkedIn, etc. (2020-current)

### Science Communication

- Attended the Tokyo University of Agriculture and Technology Exchange program in Japan (2017-2018)
  - Coordinated the Tokyo University of Agriculture and Technology Exchange program at Cornell
  - Hosted classes on science communication and effective science writing (2018)
- Freelance writer for Garden Streets; Write blog posts that convey scientific plant knowledge accessibly to a broad audience (2020-current)

### Diversity and Inclusion

- Volunteer for the Cornell Diversity Preview Weekend, designed to promote diversity and inclusion in the incoming graduate program applicants (2018)
- Volunteer with the Urban 4-H Summer camp at Cornell University (2018)
  - Worked with a team of girls from NYC to create a mock-podcast about agriculture.

## Science Policy

- Member of the executive board for Advancing Science and Policy at Cornell (2020-current)
- Attended Science Policy, a course at Cornell University, which taught how to write science policy memos
- Met with congressional staff to advocate for the Research Investment to Spark the Economy Act or RISE Act (2021)
- Is an associate editor for the Journal of Science Policy and Governance (2021)
- Current member of American Association for the Advancement of Science (AAAS) (2020-current)

## Skills

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**DNA/RNA Manipulation:** Crisper technology, plasmid ,genomic DNA, and total RNA extraction, electrophoresis, plasmid vector construction, primer design, PCR and qPCR, site-specific mutation, gene positioning. Proficiency in the use of various conventional laboratory instruments.

**Protein manipulation:** RNA immunoprecipitation, SDS-PAGE and staining, bacterial expression and purification, Western-blot, luciferase complementary technology (LCI assay).

**Plant Grafting:** Bench and field grafting for herbaceous and woody crops.

**Plant physiology techniques:** Arabidopsis, Tomato, and various Solanaceae *Agrobacterium tumefaciens* mediated transformation; cell- and tissue-culture.

**Histology:** Tissue embedding and sectioning (microtome and cryotome), histochemical staining (traditional, fluorescent, and mobile dyes).

**Imaging:** Light microscopy, fluorescent microscopy, confocal microscopy

**Genomics and Bioinformatics:** Proficient in Linux/UNIX environment and R, proficient in use of commonly used biological software such as MEGA, commonly used databases such as NCBI-PubMed, and tools such as Google Scholar and Endnote/Mendeley/Zotero.

**Data Analysis:** R, Linux/UNIX, bio-statistics, ImageJ/Fiji, nucleic acid and protein sequence similarity analysis, phylogenetic tree construction, protein secondary structure and tertiary structure prediction,

**Communication:** Advanced knowledge in media design, proven oral and written communication skills (both to technical and general audiences), beginner in spoken and written Mandarin Chinese

**Leadership:** Excellent team player, collaborative worker, self-starter, has held multiple leadership positions during PhD (Advancing Science and Policy – Board Member; Plant Biology Graduate Student Association – Treasurer, etc.

## Publications

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**Thomas, H.R.,** Van den Broeck, L., Spurney, R., Sozzani, R., Frank, M.H. (2021). Gene regulatory networks for compatible versus incompatible grafts identify a role for SIWOX4 during junction formation. *The Plant Cell*.  
<https://doi.org/10.1093/plcell/koab246>

Yue, Y., Du, J., Li, Y., **Thomas, H. R.**, Frank, M. H., Wang, L., & Hu, H. (2021). Insight into the petunia Dof transcription factor family reveals a new regulator of male-sterility. *Industrial Crops and Products*.  
<https://doi.org/10.1016/j.indcrop.2020.113196>

Chen, C., Chen, H., Zhang, Y., **Thomas, H.R.**, Frank, M.H., He, Y., Xia, R. (2020) "TBtools, a toolkit for biologists integrating various biological data handling tools with a user-friendly interface." *Molecular Plant*,  
<https://doi.org/10.1016/j.molp.2020.06.009>

**Thomas, H. R.**, & Frank, M. H. (2019). Connecting the pieces: uncovering the molecular basis for long-distance communication through plant grafting. *New Phytologist*. <https://doi.org/10.1111/nph.15772>

## Conference Presentations

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### Oral Presentations

**Thomas, H.**, Teng, C. Meyers, B. Functional analysis of phasiRNA in soybean and maize (2016, August). REU Research Symposium, Donald Danforth Plant Science Center, St. Louis, Missouri. (2017, February). Michigan State University Fellowship Committee, East Lansing, Michigan.

**Thomas, H.**, Frank, M. Pepmato: a potential model for graft incompatibility (April 2019). Plant Biology, Cornell University, Ithaca, New York.

**Thomas, H.**, Frank, N. Graft Junction Formation in Tomato (Jan 2020). Empire State Producers Expo, Syracuse, New York

**Thomas, H.**, Van den Broeck, L., Spurney, R., Sozzani, R., Frank, M.H. Gene regulatory networks for compatible versus incompatible grafts identify a role for SIWOX4 during junction formation. (Virtual- July 2021) Plant Biology

### Poster Presentations

**Thomas, H.** Arruda, J. (2015, February). Preliminary Key to Aquatic Snails in Kansas. Pittsburg State Research Colloquium, Pittsburg, Kansas.

**Thomas, H.**, Teng, C. Meyers, B. Functional analysis of anther phasiRNA in soybean. (2017, January). Plant and Animal Genome Conference, San Diego, California (2017, February). Pittsburg State Research Colloquium 2017, Pittsburg, Kansas.

**Thomas, H.** Rider, V. The spatial expression of the T cell homing receptor, CCR7, is differentially regulated by progesterone and estradiol in the rat uterus. (2017, February). Capitol Research Summit, Topeka, Kansas. (2017, April) Endocrine 2017, Orlando, Florida. (2017, April). Pittsburg State Research Colloquium 2017, Pittsburg, Kansas. **Thomas, H.**, Frank, M. Pepmato: a potential model for graft incompatibility (June 2019). Plant Vascular Biology Meeting, Asilomar, California  
**Thomas, H.**, Frank, M. Pepmato: a potential model for graft incompatibility (June 2019). Plant Vascular Biology Meeting, Asilomar, California  
**Thomas, H.**, Van den Broeck, L., Spurney, R., Sozzani, R., Frank, M.H. Pepmato, Tomepper, and the Visualization of Graft Incompatibility (Virtual- July 2020). Plant Biology 2020.  
**Thomas, H.**, Van den Broeck, L., Spurney, R., Sozzani, R., Frank, M.H. WOX4 is involved in graft junction formation in Solanaceae (Virtual- August 2020). Sainsbury Lab Symposium.  
**Thomas, H.**, Van den Broeck, L., Spurney, R., Sozzani, R., Frank, M.H. Gene regulatory networks for compatible versus incompatible grafts identify a role for SIWOX4 during junction formation. (Virtual-April 2021) Northeast Regional Meeting of the Society of Developmental Biology.

## References

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**Margaret Frank, PhD** | Assistant Professor of Plant Biology  
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**Jen Gouldstone** | CEO of Garden Streets  
Garden Streets  
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**Joyce Van Eck, PhD** | Adjunct Professor of Plant Breeding and Genetics, Direction of BTI Transformation Facility  
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**Blake Meyers, PhD** | Professor of Plant Sciences, University of Missouri  
Donald Danforth Plant Science Center  
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bmeyers@danforthcenter.org

**Neil Snow, PhD** | Professor of Botany, Director of T.M. Sperry Herbarium  
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