Juniper A. Lake

Curriculum Vitae

Education

2018–Present **Ph.D. Candidate. Bioinformatics and Systems Biology**.
University of Delaware: Newark, DE. OGPA - 4.0/4.0

2015–2017 **M.S. Plant and Soil Sciences**.
University of Delaware: Newark, DE. OGPA - 4.0/4.0

2009–2013 **B.S. Economics**.
University of Pennsylvania (Wharton): Philadelphia, PA. OGPA - 3.7/4.0, magna cum laude

2009–2013 **B.A. International Studies**.
University of Pennsylvania: Philadelphia, PA. OGPA - 3.7/4.0, magna cum laude
Study abroad: Santiago, Chile; Spring 2011

Relevant courses

Ph.D. Artificial intelligence, Advanced artificial intelligence: Simulation and modeling bioinformatic systems, Computational biology and bioinformatics, Databases for bioinformatics, Systems biology

M.S. Applied plant virology, Biological control, Ecological modeling, Genetics and breeding, Genome science: Technologies and techniques, Insect anatomy and physiology, Insect identification and taxonomy, Introduction to plant physiology

B.S. Corporate finance, Introduction to business statistics, Leadership and communication in groups, Managerial economics, Multivariable calculus, Risk analysis and management

Research experience

2018–Present **Graduate Research Assistant**, *University of Delaware*, Animal and Food Sciences.

- Conducting groundbreaking research on a novel and complex muscle disorder in broiler chickens called "wooden breast" that causes major economic losses and welfare concerns worldwide.
- Identifying similarities between wooden breast and type II diabetes in humans that may inform future research on human health and disease.
- Characterizing the genetic architecture of wooden breast and related traits in a genome-wide association study (GWAS) of over 1200 broiler chickens.
- Identifying blood biomarkers of wooden breast for use in diagnosis and breeding.
- Enhancing our understanding of the the early pathogenesis of wooden breast with differential expression analysis of 2-week-old birds that may later develop the disorder.
- Provided mentorship for (1) undergraduate student Connor Pitman in research on sex-based differences in gene expression of broiler chickens, (2) visiting graduate student Amélie Hoste in research on altered gene expression in the liver of broilers with wooden breast.

2015–2017 **Graduate Research Assistant**, *University of Delaware*, Plant and Soil Sciences.

- Studied a fatal and widespread disease of landscape roses called rose rosette disease, which is caused by a multipartite emaravirus and is vectored by an eriophyid mite. Rose rosette disease has no cure and causes extreme disfiguration of the plant and death within one to three years.
- Managed a large, randomized field trial to screen more than 200 genotypes of roses for resistance to rose rosette disease.
- Conducted experiments in transmission and biological control of rose rosette in an attempt to inform interim solutions for the disease before a successful breeding program for resistance comes to fruition.

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Fall 2018 **Independent Study**, *University of Delaware*, Advisor: Adam Marsh.

- Created a program to assist in diagnosing issues associated with low mapping rates of sequencing reads to a reference genome. The program can quickly assess the genomic and organismal diversity of a FASTQ file from a personal computer by invoking NCBI's servers over the internet.

Spring 2017 **Independent Study**, *University of Delaware*, Advisor: Randall Wisser.

- Wrote a program to simulate genetic recombination in an F2 population of maize, compare simulated allele frequencies to observed genotyping by sequencing (GBS) data, and model loci along each chromosome where allele frequencies differed significantly from expected.

Teaching experience

May 2019 **Instructor**, *Software Carpentry Workshop*.

- Taught the Unix shell, version control with Git, and programming in R with co-instructor Zenobie Garrett during a 2-day workshop at the Delaware Biotechnology Institute. Newark, Delaware, (May 9-10, 2019).

Nov. 2017 **R Workshop Teaching Assistant**, *Entomology 2017*.

- Provided hands-on troubleshooting of programming issues during a 4-hour 'live coding' R workshop entitled "Making the switch: A beginner's guide to R for those familiar with other packages" at the national Entomological Society of America meeting. Denver, Colorado, (November 5-8, 2017).

Spring 2017 **Graduate Teaching Assistant**, *University of Delaware*, Plant and Soil Sciences.

- Taught the weekly laboratory portion of Introductory Plant Pathology.
- Prepared fungal and bacterial cultures, maintained a steady supply of culture media, and oversaw student experiments.
- Graded student exams and lab reports, managed an undergraduate assistant, and collaborated on how the class could be improved.

Spring 2013 **Undergraduate Teaching Assistant**, *University of Pennsylvania*, Biology Department.

- Conducted review sessions, graded exams, and served as the main liaison for the course outside of lecture hours.
- Coordinated community service projects focused on urban agriculture and food justice in local Philadelphia schools. Helped students develop lesson plans and prepared them to interact with elementary and middle school students.

2009–2013 **Instructor**, *Philadelphia Freedom Schools & Agatston Urban Nutrition Initiative*.

- Developed and implemented daily lesson plans in math and literacy for second and third grade students and provided tutoring support for K-8th grade students at Henry C. Lea Elementary School.
- Facilitated conflict resolution and skill building. Taught an enrichment class that covered use of basic hand tools and promoted self-reliance.
- Helped build grow benches and refurbish the greenhouse that had fallen into disrepair at University City High School. Prepared herb seedlings and ornamental hanging baskets for sale and fundraising.
- Taught students to grow oyster mushrooms in coffee grounds at Pepper Middle School. Guided students in building a grow chamber and preparing mushrooms for consumption.

Leadership positions

2018–2019 **Communications Committee Chair**, *Graduate Student Government*, University of Delaware.

- Developed event advertisements and organizational branding.
- Maintained the Graduate Student Government website and social media pages.

2018–2019 **Senator for Bioinformatics Program**, *Graduate Student Government*, University of Delaware.

- Attended Graduate Student Government public meetings to vote on legislation and advocate on behalf of social and professional programming for graduate students.

2018–2019 **Vice President**, *Bioinformatics Student Association*, University of Delaware.

- Organized social and professional events which included a programming workshop, a biotechnology career panel and networking dinner, and regular happy hours with invited speakers.
- Designed a new website and updated branding for the organization.
- M.C.ed a biotechnology career panel with guest speakers from industry, academia, and government for students to learn about diverse career paths post-graduation.

2017–2018 **Secretary**, *Bioinformatics Student Association*, University of Delaware.
- Organized and advertised events, took minutes at officer meetings, and served as a resource to new students in the bioinformatics program.

2015–2017 **Dance Instructor & Event Coordinator**, *Jazz Attack & Powerhouse Blues*, Philadelphia.
- Taught dance classes, helped organize large weekend dance events that hosted dancers from across the country, and DJed weekly dances at two organizations in Philadelphia that specialize in lindy hop, east coast swing, balboa, and blues.

Peer-reviewed publications

2020 Abasht B., Mignon-Grasteau S., Bottje W., and **Lake JA** (2020) "Genetics and genomics of feed utilization efficiency traits in poultry species," in *Advances in Poultry Genetics and Genomics*, eds. S. E. Aggrey, H. Zhou, M. Tixier-Boichard, and D. D. Rhoads. Burleigh Dodds Science Publishing [in press].

2020 **Lake JA**, Brannick EM, Papah MB, Lousenberg C, Velleman SG, and Abasht B. (2020) Blood gas disturbances and disproportionate body weight distribution in broilers with wooden breast. Frontiers in Physiology 11:304. DOI: 10.3389/fphys.2020.00304

2020 **Lake JA** and Abasht B. (2020) Glucolipotoxicity: A proposed etiology for wooden breast and related myopathies in commercial broiler chickens. Frontiers in Physiology 11:169. DOI: 10.3389/fphys.2020.00169

2019 **Lake JA**, Papah MB, and Abasht B. (2019) Increased expression of lipid metabolism genes in early stages of wooden breast links myopathy of broilers to metabolic syndrome in humans. Genes 10:746. DOI:10.3390/genes10100746

2018 Wax J, Zhuo Z, Bower A, [and 9 others, including **Novick DN**]. (2018) A problem-based learning exercise on food security: understanding the role of genomic variation and plant breeding. Genetics Society of America Peer-Reviewed Education Portal 004. DOI:10.1534/gsaprep.2018.004

2018 Byrne D, Klein P, Yan M, [and 7 others, including **Novick DN**]. (2018) Challenges of breeding rose rosette resistant roses. HortScience 53:5. DOI:10.21273/HORTSCI12553-17

Posters and presentations

2020 **Lake JA**, Walugembe M, Kramer L, Dekkers JCM, and Abasht B. Genetic basis of wooden breast and white striping in commercial broilers. Poster presented at: Plant and Animal Genome Conference XXVIII; 2020 Jan 11-15; San Diego, CA.

2019 **Lake JA**, Dekkers JCM, Velleman SG, Brannick EM, and Abasht B. Preliminary results from genome wide association study of wooden breast in commercial broilers. Oral presentation given at: Poultry Science Association Annual Meeting; 2019 Jul 15-18; Montreal, QC, Canada.

2019 **Lake JA**, Velleman S, Brannick E, and Abasht B. Blood analysis and proportional muscle and organ weights in broilers with wooden breast. Poster presented at: Plant and Animal Genome Conference XXVII; 2019 Jan 12-16; San Diego, CA.

2018 **Lake JA**, Tomlinson IV MJ, and Abasht B. FastqBLAST: A tool to quickly assess the organismal and genomic diversity present in a FASTQ file. Poster presented at: 26th Conference on Intelligent Systems for Molecular Biology; 2018 Jul 6-10; Chicago, IL.

2018 Behnam A, Dekkers JCM, Velleman SG, Schmidt C, and **Lake JA**. Genome wide identification and functional validation of genes causing susceptibility to wooden breast in commercial broiler chickens. Poster presented at: 2018 NIFA Joint Animal Nutrition, Growth and Lactation and Early Concept Grants for Exploratory Research (EAGERs) Project Director Meeting; 2018 Jun 12-13; Washington, DC.

2018 **Novick DN**, Tomlinson IV MJ, Papah MB, Chazi Capelo JD, and Abasht B. A new tool to prioritize candidate genes and characterize sample behavior in differential expression analysis of transcriptomic data. Poster presented at: Plant and Animal Genome Conference XXVI; 2018 Jan 13-17; San Diego, CA.

2017 **Novick DN** and Evans T. Evaluation of rose germplasm for resistance to rose rosette disease. Poster presented at: American Phytopathological Society Potomac Division Meeting; 2017 Mar 22-24; Morgantown, WV.

Dissertations and theses

Master's Thesis. Evaluation of rose germplasm for resistance to rose rosette disease and studies of disease transmission and vector control. *Research Advisor: Tom Evans*

Undergraduate Honors Thesis. Smallholder agroforestry programs: An instrument for mitigating supply chain risk. *Research Advisor: R. Scott Poethig*

Honors and awards

Doctoral Fellowship Award from the University of Delaware, July 2020 to June 2021

$28,000 Graduate Scholars Award from the University of Delaware for academic achievements as a first-generation college student, September 2019 to June 2020

$30,000 Unique Strengths Fellowship for research in genetics and genomics from the University of Delaware College of Agriculture and Natural Resources, September 2018 to August 2019

$1,950 Summer Institutes Scholarship from University of Washington biostatistics department to attend the Summer Institute in Statistical Genetics at the University of Washington in Seattle, July 2018

$500 Professional Development Award from the University of Delaware to participate and present at the Intelligent Systems for Molecular Biology, July 2018

$3,715 Summer Doctoral Fellowship from the University of Delaware to attend the Summer Institute in Statistical Genetics at the University of Washington in Seattle, July 16th to 27th 2018

– 1st place in regional Linnaean Games (insect trivia) at Entomological Society of America's Eastern Branch Meeting

$3,000 National Science Foundation I-Corps Sites Grant for research into commercialization of a poultry feed additive, March to April 2018

$800 Neal A. Jorgenson Genome Travel Award in Bioinformatics to attend and present at the Plant and Animal Genome Conference XXVI in San Diego, California, January 2018

– 3rd place in national Linnaean Games (insect trivia) at Entomological Society of America's National Meeting in Vancouver, B.C.

– 2nd place in regional Linnaean Games (insect trivia) at Entomological Society of America's Eastern Branch Meeting

– Dean's List and The Wharton School Dean's List for 2009-2010, 2011-2012, and 2012-2013

Workshops and short courses

Summer Institute in Statistical Genetics. Association mapping: Genome wide association studies and sequencing data, Computational pipeline for whole genome sequencing data, Advanced quantitative genetics, Statistical and quantitative genetics of disease. University of Washington, Seattle, (July 16-27, 2018).

Intelligent Systems in Molecular Biology. Machine learning methods in the analysis of genomic and clinical data, Visualization of large biological datasets. Chicago, Illinois, (July 6-10, 2018).

Software Carpentry. Programming with Python, Version control with Git, The Unix shell. University of Delaware, Newark, (August 14-15, 2017).

Genomics Data Carpentry. Project organization and management for genomics, Introduction to the command line for genomics, Data wrangling and processing for genomics, Introduction to cloud computing for genomics. University of Delaware, Newark, (March 29, 2017).

Membership in professional societies

2017–Present	Intelligent Systems for Molecular Biology
2017–Present	Poultry Science Association
2017–2019	Entomological Society of America
2015–2017	American Phytopathological Society

Skills

Scripting/ Programming	Python (excellent), R (excellent), Perl (familiar)
OS	Linux environment on HPC cluster, OSX, Windows
Bioinformatics programs	ASReml, BLAST, Cufflinks, DESeq, EdgeR, FastQC, FImpute, GCTA, GenSel, HISAT, HTSeq, KGD, MultiQC, polyRAD, SAMtools, Trimmomatic, VCFtools
Markup	HTML, Jupyter, LaTeX, Markdown, RMarkdown
Version control	Git, GitHub
Public databases	Animal QTLdb, Ensembl, NCBI
Wet lab	DNA-Seq and RNA-Seq library preparation, RT-PCR

Interests

Bikes	Recreational road and cross country mountain biking
Dance	Lindy hop, balboa, blues, charleston, east coast, collegiate shag, St. Louis shag
Rocks	Bouldering, sport climbing, top-rope
Banjo	Bluegrass and clawhammer style

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