

## Andrew C. Read

Wheat and Oat Geneticist – United States Department of Agriculture  
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### Education

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2020 Cornell University Section of Plant Pathology and Plant-Microbe Biology. PhD Thesis: Defense and Counter-Defense in the Rice-*Xanthomonas* Pathosystem. Supervisor: Dr. Adam Bogdanove.

2006 University of Hawaii at Hilo. B.A.: Ecology, Evolution, and Conservation Biology. Research advisor: Dr. Michael Shintaku

### Training

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2021 Inclusive Science Education Fellow. University of Minnesota. Coordinator: Meaghan Stein.

2016 QTL Editing Workshop. University of Minnesota. Workshop coordinator: Dr. Dan Voytas

2015 Rice Research to Production Course. International Rice Research Institute, Los Baños, Philippines. Course coordinator: Dr. Jan Leach

### Professional Experience

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2023-Present **Wheat and Oat Geneticist** – USDA ARS, Saint Paul, MN  
Develop novel genomics-enabled selection strategies for improving yield-limiting diseases in wheat and oat. Identify genes or genomic regions associated with biotic and abiotic stress tolerance or other important traits in wheat and oat. Coordinate the Hard Red Spring Wheat Uniform Regional Nursery and the Uniform Regional Scab (*Fusarium* head blight) Nursery.

2009-2013 **Research Associate** – Monsanto Co., Cambridge, MA  
Project team leader responsible for coordination within and among Monsanto sites for the optimization of a novel insecticidal protein. Above and Beyond Award recipient for contributions to optimization of fourth generation herbicide tolerance trait – contribution included synthesis and *in vitro* assay of hundreds of protein variants.

2008 **Research Technician** (contract) – Radius Pharmaceuticals, Cambridge, MA  
Performed and analyzed molecular assays as a part of the *in vitro* research and development team at a pharmaceutical start-up, including radioimmunoassay, fluorescence- polarization ligand binding, and mammalian tissue culture.

2006-2008 **Research Lab Specialist** – Research Corp. of the University of Hawaii, Hilo, HI  
Surveyed East Hawaii commercial orchid operations for presence of major orchid viruses using a variety of nucleic acid and immunological techniques. Analyzed soil samples for relative abundance of bacterial pathogens. Established and maintained tissue culture and greenhouse collection of over 20 Hawaiian taro varieties.

## Research Experience

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2021-Present **Postdoctoral Fellow** – Springer Lab – UMN

Studying the relationships between dynamic DNA methylation, transposon regulation, and defense gene expression and how these relationships may guide the evolution and diversity of plant immunity genes.

2013-2020 **Graduate Student** – Bogdanove Lab – Cornell University

The role of truncated TAL effectors in the suppression of rice disease resistance. Characterization of rice bacterial leaf streak susceptibility gene OsSULTR3;6– including sub-cellular co-localization, designer TAL effector activation of paralogs, and genome editing of the native locus. Additionally, rotated in the labs of Dr. Alan Collmer and Dr. Greg Martin.

## Teaching and Mentorship

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2023 **Guest Instructor.** UMN Applied Plant Genomics and Bioinformatics

Designed and implemented a 2.5 hour long-read sequencing lecture and lab. The module provided background on how Nanopore sequencing works, what the DNA input requirements are, and hands-on bioinformatic analysis of raw Nanopore output (base-calling and aligning to a reference).

[https://github.com/acread/Presentations\\_And\\_Resources/blob/main/2023\\_LongReadLab.md](https://github.com/acread/Presentations_And_Resources/blob/main/2023_LongReadLab.md)

[https://github.com/acread/Presentations\\_And\\_Resources/blob/main/agro5431\\_Nanopore\\_Presentation.pdf](https://github.com/acread/Presentations_And_Resources/blob/main/agro5431_Nanopore_Presentation.pdf)

2023 **Mentor.** UMN Directed Research.

Mentored undergraduate student for a semester-long 3-credit directed research project developing a Setaria-Xanthomonas pathosystem, examining the impact of humidity on disease outcomes, and utilizing RaspberryPi-based systems to monitor disease progression.

2021 and 2022 **Guest Instructor.** UMN Applied Plant Genomics and Bioinformatics

Designed interactive 50-minute lecture on plant NLR immunity genes – including background material, comparison of methods to detect NLR genes from genomic sequences, and the importance of pangenomes in NLR studies.

[https://github.com/acread/Presentations\\_And\\_Resources/blob/main/FINAL\\_NLR-Pangenomes.pdf](https://github.com/acread/Presentations_And_Resources/blob/main/FINAL_NLR-Pangenomes.pdf)

2018 **Guest Instructor.** Cornell Laboratory in Plant Molecular Biology

Created lecture and lab materials for a graduate level module on genome editing including background on CRISPR/Cas reagents and PCR-based screening methods.

2017 **Teaching Assistant.** Cornell PLBIO2300 “Global Plant Biodiversity and Vegetation”

Facilitate class discussions based on readings and grade coursework and exams for 25 students.

2017 **Co-mentor** – Research Experience for Undergraduates (REU)

Summer project exploring TAL effector applications in synthetic biology as repressors of bacterial gene expression. Student has been accepted to a virology graduate program.

2016 **Mentor** – REU

Student designed and tested modified TAL effectors that could be used in synthetic biology applications in order to modulate bacterial gene expression. Student currently in medical school.

2015                   **Mentor** - CienciAmerica Program

Student employed molecular cloning techniques to construct bacterial expression vectors and carried out *in planta* assays. Student currently pursuing PhD in plant-pathology at Cornell.

2014                   **Teaching Assistant**. Cornell PLPA3010 “Biology and Management of Plant Diseases”

Prepared and delivered lectures, taught basic lab safety and technique, and graded coursework for weekly lab section made up of 21 undergraduate and graduate students. Additionally, with fellow TA, prepared and delivered two 50-minute lectures on molecular plant-pathogen warfare to the 40-student class.

2014                   **Co-mentor** - REU

Student utilized a variety of computational and molecular techniques to design and synthesize designer TAL effectors targeting specific rice promoters. Student is currently pursuing PhD in biomedical research at Vanderbilt University.

2008                   **Mentor** – Local, State, and International Science Fair

Mentor for Hawaii Island high school student exploring virus incidence and tissue culture of Hawaiian varieties of taro (*Colocasia esculenta* var. *esculenta*). Student went on to complete organic chemistry PhD at UC Santa Cruz.

## **Publications**

2023   Scinto-Madonich, NJ, S Baruah, S Young, K Vignona, **AC Read**, SCD Carpenter, L Wang, X Shi, G Chang, M Piñeros, and AJ Bogdanove. Initial characterization of a bacterial leaf streak susceptibility gene suggests it encodes a membrane transporter that influences seed nutrition and germination. *Physiological and Molecular Plant Pathology*. Jul;126. doi: 10.1016/j.pmpp.2023.102031

2023   Ellison, E, P Zhou, P Hermanson, YH Chu, **AC Read**, CN Hirsch, E Grotewold, and N Springer. Mutator transposon insertions within maize genes often provide novel outward reading promoter. *GENETICS*. **Accepted**.

2023   Munasinghe, M, **AC Read**, MC Stitzer, B Song, C Menard, KY Ma, Y Brandvain, CN Hirsch, and N Springer. Combined analysis of transposable elements and structural variation in maize genomes reveals genome contraction outpaces expansion. *BioRxiv PREPRINT*. doi: 10.1101/2023.03.02.530873

2023   Lovelace, A, **AC Read**, N Ginnan, and K Cox. The 2022 Early career showcase: a model for future virtual symposiums. *IS-MPMI Interactions*. Issue 1, 2023.  
[www.ismpmi.org/Community/Interactions/Lists/Posts/Post.aspx?ID=1255](http://www.ismpmi.org/Community/Interactions/Lists/Posts/Post.aspx?ID=1255)

2022   **Read, AC**, T Weiss, PA Crisp, Z Liang, J Noshay, CC Menard, C Wang, M Song, CN Hirsch, NM Springer, and F Zhang. Genome-wide loss of CHH methylation with limited transcriptome changes in *Setaria viridis* domains rearranged methyltransferase (DRM) mutants. *The Plant Journal*. Jul;111(1):103-116. doi: 10.1111/tbj.15781

2021   Wang, L, H Betul Kaya, N Zhang, R Rai, MR Willmann, SCD Carpenter, **AC Read**, F Martin, Z Fei, JE Leach, GB Martin, and AJ Bogdanove. Spelling changes and fluorescent tagging with prime editing vectors for plants. *Frontiers in Genome Editing*. 3:617553. doi: 10.3389/fgeed.2021.617553

- 2020 **Read, AC**, M Hutin, MJ. Moscou, FC. Rinaldi, and AJ Bogdanove. Cloning of the rice Xo1 resistance gene and interaction of the Xo1 protein with the defense-suppressing *Xanthomonas* effector Tal2h. *Molecular Plant-Microbe Interactions*. 33(10):1189-1195. doi: 10.1094/MPMI-05-20-0131-SC
- 2020 Scott, AD, A Zimin, D Puiu, R Workman, M Britton, S Zaman, M Caballero, **AC Read**, AJ Bogdanove, E Burns, JL Wegrzyn, W Timp, SL Salzberg, DB Neale. A reference genome sequence for the Giant Sequoia. *G3: Genes, Genomes, Genetics*. 10(11):3907-3919. doi: 10.1534/g3.120.401612
- 2020 **Read, AC**, MJ Moscou, AV Zimin, G Pertea, RS Meyer, MD Purugganan, JE Leach, LR Triplett, SL Salzberg, AJ Bogdanove. Genome assembly and characterization of a complex zfBED-NLR gene-containing disease resistance locus in Carolina Gold Select rice with Nanopore sequencing. *Plos Genetics*. 16(1):e1008571. doi: 10.1371/journal.pgen.1008571
- 2017 Helmkampf, M, T Wolfgruber, M Bellinger, R Paudel, M Kantar, S Miyasaki, H Kimball, A Brown, A Veillet, **AC Read**, and M Shintaku. Phylogenetic relationships, breeding implications, and cultivation history of Hawaiian taro (*Colocasia esculenta*) through genome-wide SNP genotyping. *Journal of Heredity*. 109(3):272-282. doi: 10.1093/jhered/esx070
- 2016 **Read, AC**, FC Rinaldi, M Hutin, YQ He, LR Triplett, and AJ Bogdanove. Suppression of *Xo1*-Mediated Disease Resistance in Rice by a Truncated, Non-DNA-Binding TAL Effector of *Xanthomonas oryzae*. *Frontiers in Plant Science*. 7:1516. doi: 10.3389/fpls.2016.01516
- 2016 Rydel, TJ, AM Wollacott, R. Brown, W. Akbar, TL Clark, S. Flasiński, JR Nageotte, **AC Read**, X. Shi, BJ Werner, MJ Pleau, JA Baum, and A Gowda. A transgenic approach for controlling *Lygus* in cotton. *Nature Communications*. 26;11(1):1152. doi: 10.1038/ncomms12213
- 2014 Ellis, C, A Evdokimov, P Feng, X Fu, C Larue, JR Nageotte, **AC Read**, and AM Wollacott. Herbicide tolerance genes and methods of use thereof. US patent application no. 62/064,343.

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## Awards and Grants

- 2021 NSF-PRFB Postdoctoral Fellowship “The role of transposable elements and DNA methylation on immunity gene regulation and diversification in maize and the model monocot *Setaria viridis*”
- 2018 USDA-NIFA Predoctoral Fellowship “Defining the resistance profile of a broad- spectrum defense gene family”
- 2018 APS foundation student travel award to attend ICPP in Boston, MA
- 2017 Cornell University Barbara McClintock Graduate Student Award

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## Selected Posters and Presentations

- 2023 **Read, AC**, M Munasinghe, N Springer, and C Hirsch “The impact of genic structural variants on gene expression profiles across the NAM founder lines” Maize Genetics Meeting. Poster.
- 2022 **Read, AC** “Two for One: DNA methylation and sequence data from Nanopore long reads” UMN Center for Precision Plant Breeding seminar series.

2022 **Read, AC** “What’s up with DNA methylation? Thoughts from a plant pathologist” Zeavolution seminar series. **Presentation:** [zeavolution.slack.com/files/U02CZT7B8Q5/F04591J9LPM/video1687670516.mp4](https://zeavolution.slack.com/files/U02CZT7B8Q5/F04591J9LPM/video1687670516.mp4)

2022 **Read, AC** “What does DNA methylation have to do with plant immunity?” UMN Plant Pathology seminar series.

2020 **Read, AC** “A *Xanthomonas oryzae* effector suppresses *XoI*-mediated rice defense” 12<sup>th</sup> Japan-US Seminar in Plant Pathology.

2018 **Read, AC** “Snap! Crackle! Pop! Rice CRISPRs for tolerance to disease and environmental stress” CRISPRcon 2018. **Presentation:** [www.youtube.com/watch?v=JTCNK-PqGas&feature=youtu.be](https://www.youtube.com/watch?v=JTCNK-PqGas&feature=youtu.be)

2017 **Read, AC**, FC Rinaldi, M Hutin, YQ He, L Triplett and AJ Bogdanove. “A truncated *Xanthomonas oryzae* TAL effector required for effector triggered immunity suppression in an American heirloom rice cultivar” American Phytopathological Society Meeting. **Presentation:** [apsnet.org/publications/Webinars/pages/2017.aspx](https://apsnet.org/publications/Webinars/pages/2017.aspx)

2016 **Read, AC**, FC Rinaldi, M Hutin, YQ He, L Triplett, and AJ Bogdanove. “Truncated TAL effectors of *Xanthomonas oryzae*: from pseudogenes to virulence factors” IS- MPMI Congress.

2015 **Read, AC**, RA Cernadas, ML Harvey, and AJ Bogdanove. “Can paralogs substitute for the rice bacterial leaf streak susceptibility gene OsSULTR3;6?” *Xanthomonas* Genomics Conference. Poster.

2012 **Read, AC**, JM Palombo, AM Paquette, and H Vu. “Optimization of insecticidal proteins” Technical Community of Monsanto. Poster.

2007 **Read, AC**, B Bushe, and M Shintaku. “Characterization of a Cymbidium mosaic virus isolate that is undetectable by a commercial ELISA virus detection kit” American Phytopathological Society Meeting. Poster.

## **Service and Outreach**

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2023 AVID (Advanced Via Individual Determination) program guest speaker for two full-day sessions on college preparation and careers in plant science at two Twin Cities high schools.

2022-2023 Working group member - ROOT & SHOOT (an NSF LEAPS RCN program) to provide resources to cultivate an inclusive and equitable scientific plant science community.

2022 Panelist - UMN College of Biological Science Student Mental Health Committee Panel on Nontraditional Career Paths and Mental Health.

2022 Skype-a-Scientist – one session outreach activity to discuss plant pathology and native plants with 50 7<sup>th</sup> grade students from San Diego, CA. **Presentation:** [github.com/acread/Presentations\\_And\\_Resources/blob/main/202201\\_SkypeScientist.pdf](https://github.com/acread/Presentations_And_Resources/blob/main/202201_SkypeScientist.pdf)

2015-2017 Field representative - Cornell Graduate and Professional Student Association Executive

2015-2017      Committee member – Plant Pathology and Plant-Microbe Biology Graduate Student Association (PPPMB-GSA)

2017              Colloquium Committee chair – PPPMB-GSA

2013-2020      Colloquium Committee member – PPPMB-GSA

### **Professional Memberships**

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American Phytopathological Society

    Bacteriology sub-committee

    Graduate student sub-committee

American Society of Plant Biologists

International Society for Molecular Plant-Microbe Interactions

SACNAS

Maize Genetics Cooperation

### **Referee**

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Frontiers in Plant Science

Gene Journal

Journal of Integrative Agriculture

New Phytologist

Plant Biotechnology Journal

Rice