

AG2PI SEED GRANT - PROJECT FINAL REPORT

PROJECT NAME	Standardizing data management and terminology for increased adoption of virtual fence systems.
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PROJECT PRINCIPAL INVESTIGATOR	TODAY'S DATE	PROJECT START DATE	DATE OF COMPLETION
Jameson Brennan	10/12/2023	5/30/2022	8/31/2023
TEAM MEMBERS (co-PI, co-I, personnel)		COLLABORATORS	
Logan Vandermark, Krista Ehlert, Hector Menendez, Ryan Reuter, Mitchell Stephenson, Dana Hoag, Paul Meiman, Josyln Bearn, Rory O'Connor		Andrew Antaya, Sarah Noelle, Brandon Mayers, Miranda Mehan, Richard Rice, Tom Hilken, Justin Shirley, Nathan Jero	

ACCOMPLISHMENTS

Please provide a short summary of the conclusions (both successes and failures) made from your project. Include a description of how this project will provide benefits to the agricultural genome to phenome community and, possibly, to a broader audience. You should include both qualitative and quantitative details, as necessary, to support your conclusions. Include a short accomplishment statement in non-technical language and do not include names.

This is not a technical report. Please keep to no more than 6-8 sentences (e.g., 1-2 sentences per point, above).

The long-term goal of this project is to *develop methodologies and documentation to successfully implement VF systems and extract meaningful insights from data generated by these systems*. One of the main successes of this grant was to organize an in-person meeting of virtual fence users and stakeholders to discuss ongoing research and extension efforts related to virtual fencing systems. This meeting was attended by 60 individuals and presenters representing 12 universities, 2 USDA-ARS stations, 3 federal land management agencies, 1 NGO, and 2 industry partners. These entities represented over 100,000 acres of land and thousands of cattle being managed using this technology, which is scalable across millions of acres and heads of cattle. This event has greatly expanded the reach and collaboration of research entities working with virtual fence systems.

In addition, through this grant we hosted the first ever symposium on virtual fencing presented at the Society for Range Management meeting. This event had 9 total presentations ranging from ongoing research efforts to private livestock producers perspectives on implementing the technology. Efforts from this project will be shared with new users, research institutions, and other stakeholders to reduce data processing and implementation start-up time, thereby increasing the long-term impact of improved grazing management with this technology.

This project has aligned with the Ag2Pi community by identifying best practices and tools for handling large geospatial datasets generated by virtual fence systems, coordinated educational resources to develop tutorials on successful implementation of virtual fence systems, generate a special issue to focus on social, ecological, and economic perspectives associated with this new technology, and mitigate the environmental impacts from livestock production.

Products

ACTIVITY / PRODUCT	DESCRIPTION (include URL, if applicable)	OUTCOME / METRICS
Workshop	Vence Data Processing Hands on Workshop	In person workshop hosted with 30 people in attendance to train researchers, graduate students and agency staff on accessing data via an API and processing virtual fence data.
Conference	Virtual Fence In-Service Workshop	In person conference held in Boise Idaho on virtual fence technology and applications across research, land management agencies, extension, industry, and economics. The conference had a total of 18 presentations from 17 presenters and 60 attendees.
Ag2Pi Workshop	Brennan, J.R., Antaya, A., and Menendez, H. 2023. Virtual Fence Technology: From Raw Data Messages to Animal Energetics Models. Ag2Pi online workshop. https://www.ag2pi.org/workshops-and-activities/workshop-2023-08-07/ .	
GitHub Page	Antaya, A., Brennan, J., Jero, N., and Mayer, B. Virtual Fence Data Workshop. https://github.com/amantaya/vf-workshop .	
Symposium	Virtual Fence Technology: Challenges and opportunities for implementing virtual fence across public, private, and research sectors. 2023. Symposium – Society for Range Management.	Symposium sponsored by the seed grant at the international Society for Range Management Meetings in Boise, ID. A total of 9 presentations. Approximately 300+ attendees in the session.
Publication	Ehlert, K., Brennan, J., Beard, J., Reuter, R., Menendez, H., Vandermark, L., Stephenson, M., Hoag, D., Meiman, P., O'Connor, R., and Noelle, S. What's in a name? Virtual fencing terminology for the enhancement of research, extension, and industry applications. <i>Rangeland Ecology and Management</i> . <i>In Review</i> .	Publication from the grant currently in review.
Video	Virtual Fencing – In – Service Meeting. 2023. Youtube. https://www.youtube.com/watch?v=KH2SyRLkTII&t=182s	Youtube video on the virtual fence meeting. Currently 385 views.
Abstract	Ehlert, K., Brennan, J., Beard, J., Reuter, R., Menendez, H., Vandermark, L., Stephenson, M., Hoag, D., Meiman, P., O'Connor, R., and Noelle, S. 2024. Words matter: Standardizing virtual fencing terminology for the enhancement of research, extension, and industry applications. <i>Society for Range Management</i> . <i>In Review</i> .	Abstract submitted to 2024 Society for Range Management Meeting

Audience

With whom has this work been targeted to and shared? Please describe how this project and its products have been disseminated to a community of interest. Include any outreach activity or information sharing as well as training or professional development opportunities provided in this project.

The primary audience for this project was users of virtual fencing technology to include graduate students, researchers, federal and state land management personnel, and private livestock producers. Products have been disseminated through a variety of means including videos, online workshops, in person trainings and meetings, symposium presentations at scientific conferences, online resources, and publications.

CONTINUATION OF WORK

Next steps

How do you/your team plan to continue moving this project forward? Include how AG2PI can assist in your forward momentum.

The working group from this grant has proposed and is working towards publishing a special issue in Rangelands about virtual fencing. The planned issue will have approximately 15 articles and be published in the spring of 2024.

In addition, through this grant a 'setting up for success' virtual fence 101 guide is being developed in partnership with The Nature Conservancy. This will include articles and video series on successfully implementing virtual fence.

Additional discussions have focused on having graduate student webinar trainings to onboard new students working with virtual fence data to train them on coding and data storage.