

# MNPRO

## CWD Outreach and Research Update

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# Minnesota Center for Prion Research and Outreach (MNPRO)

Established in 2019: innovative R&D think-tank with growing portfolio.  
Leadership: **Dr. Tiffany Wolf** (Co-Director), **Marc Schwabenlander** (Associate Director)



Tiffany Wolf, DVM, PhD



Marc Schwabenlander, MPH

**70+ MNPRO research  
associates, staff, students  
across the United States**



# Outline

- CWD Outreach Efforts
- Research Productivity
  - RT-QuIC and prion diagnostic testing R&D
- Forensics Analysis of Beltrami Co. Carcass Dump Site
  - Diagnostic testing of deer remains
  - Ecological contamination





# CWD Outreach Efforts



## A Complex Disease, Simplified

INNOVATIVE TOOLS HELP PRESENT CHRONIC WASTING DISEASE EDUCATION TO DIVERSE AUDIENCES

By Marc D. Schwabenlander, Anna E. Pendleton, Tiffany M. Wolf, Peter A. Larsen and Roxanne J. Larsen

In February 2019, a team from the University of Minnesota appeared before state legislators to talk about chronic wasting disease. Speaking at an informational hearing before the Minnesota House Environment and Natural Resources Finance Division, assistant professor Peter Larsen and his team planned to focus on a multiyear research plan to develop cutting-edge diagnostic tools to combat the disease. But they faced a curveball from state Rep. Jean Wagenius. With CWD becoming a growing concern in Minnesota, Wagenius wanted to know what the university planned to do — immediately — to educate the public.

▼ Tiffany Wolf explains CWD through images and an animation of CWD infection in a deer's body to a group of elementary school students at a February 2020 Science Museum of Minnesota public event.



Credit: Peter Larsen

of information reaching underserved communities — specifically the Amish, Hmong and Tribal communities. Additional communications with stakeholders and partners made it clear that the needs were even broader: A vast spectrum of the public — K-12 students; graduate students; civic leaders; lawbreakers; agency personnel; landowners; deer, elk and caribou farmers; subsistence hunters; recreational hunters — all needed more CWD education.

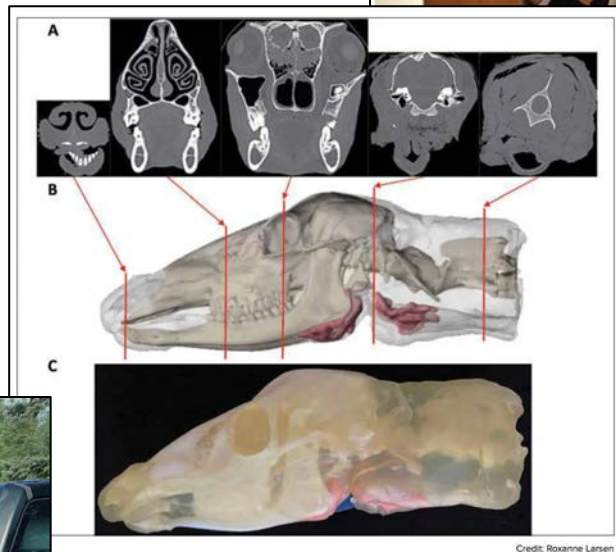
It was clear that Minnesota's CWD efforts needed to go beyond diagnostics.

### Preparing the way

CWD is a contagious, neurodegenerative disease affecting wild and farmed cervids, and it is 100% fatal. In the family of transmissible spongiform encephalopathies, it is caused by malformed prions or proteins that become infectious when misfolded. The disease was originally described in mule deer (*Odocoileus hemionus*) in Colorado in 1967, but since the mid-1990s, its occurrence rate and geographic spread have drawn States and Canada dubbed the "omni-sistence and pot" make it worthy of

CWD is a serious concern about its persistence hunting viewing. It is also risks to cervid natural resource spread across North Europe. Yet, much and ironically, much from general misperceptions of the basics of prion disease.

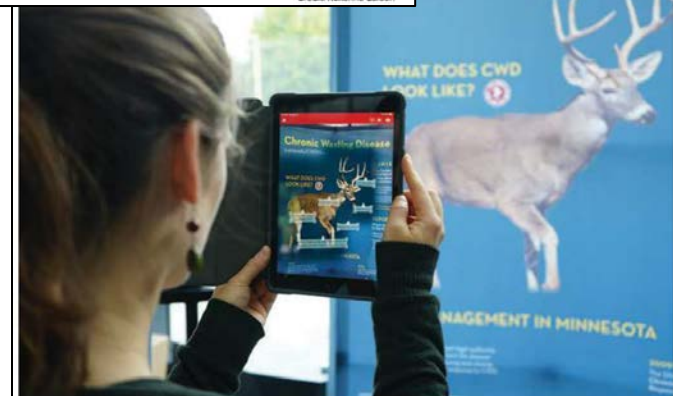
Responding to state legislature, we recruited a team to



Credit: Roxanne Larsen



Credit: Marc Schwabenlander



Credit: Anna Pendleton



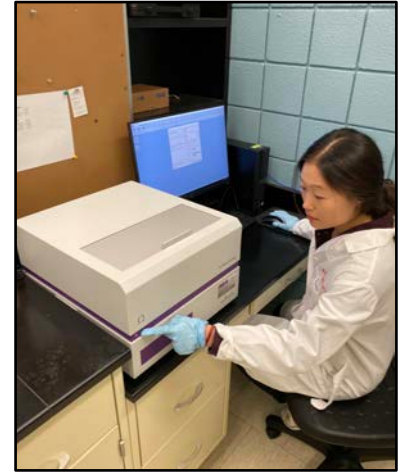
# MNPRO CWD Outreach Efforts

- Amish Community Engagement
  - Visits to Amish community leaders in Spring 2021
  - Interviews to better understand community-level knowledge and concerns of CWD (Harmony, Granger, Canton)
- Hmong and Tribal Nation Community Interviews
  - Identify critical educational needs to directly inform outreach material
  - Develop a better understanding of cultural values and norms to help direct outreach
    - Hmong community throughout Twin Cities; 7 Tribal Nations
    - Ongoing effort
- Assisting Tribal Nations in the establishment of a CWD surveillance network



# MNPRO Prion Diagnostic R&D

- RT-QuIC
  - Sensitive and robust prion detection assay
  - Primary diagnostic test in MNPRO lab
    - Protocols for: multiple tissues, blood, feces, soil, water, plants, insects, surface swabbing
  - MNPRO is first team to epidemiologically validate RT-QuIC in natural populations (thanks to DNR, BAH, and USDA)
  - Can detect CWD prions in sample that traditional tests can't use (decomposing tissues, feces, blood, environmental samples, etc.)



# MNPRO Prion Diagnostic R&D

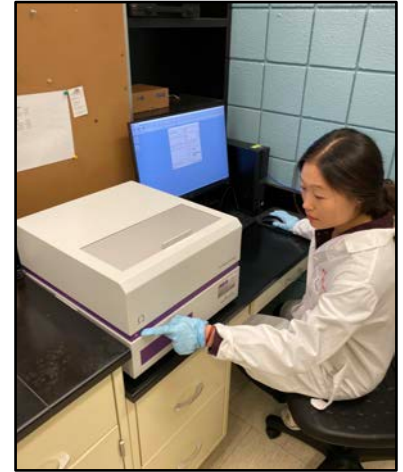
- RT-QuIC as a potential CWD food-safety tool
  - We developed protocol to detect CWD prions in white-tailed deer muscles (collaboration with DNR)
  - Will work with MDA to test food-safety applications

Article | [Open Access](#) | Published: 18 August 2021

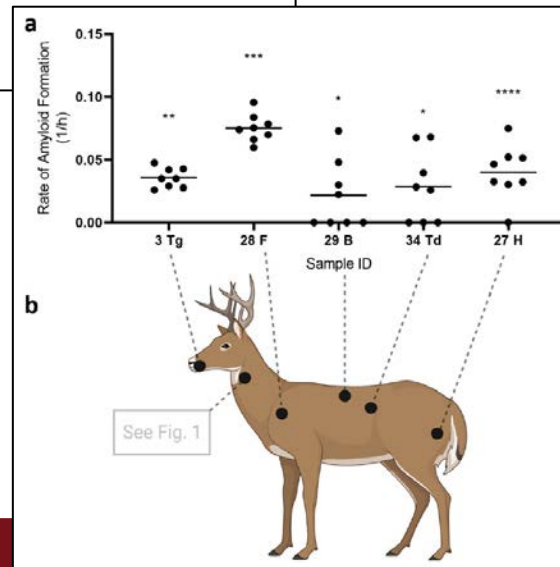
## RT-QuIC detection of CWD prion seeding activity in white-tailed deer muscle tissues

Manci Li, Marc D. Schwabenlander, Gage R. Rowden, Jeremy M. Scheffers, Christopher S. Jennelle, Michelle Carstensen, Davis Seelig & Peter A. Larsen 

*Scientific Reports* **11**, Article number: 16759 (2021) | [Cite this article](#)



Manci Li: LCCMR supported PhD student



# MNPRO Prion Diagnostic R&D (MN-QuIC™)

- First research team in history to test for CWD in the field (March 2021)
  - Thanks to LCCMR, MAES RARF, MN Legislature
- Scientific publication ready to submit for peer-review
- Must be further validated (including by partner labs)



CWD + CWD -  
Control Control - - - + -

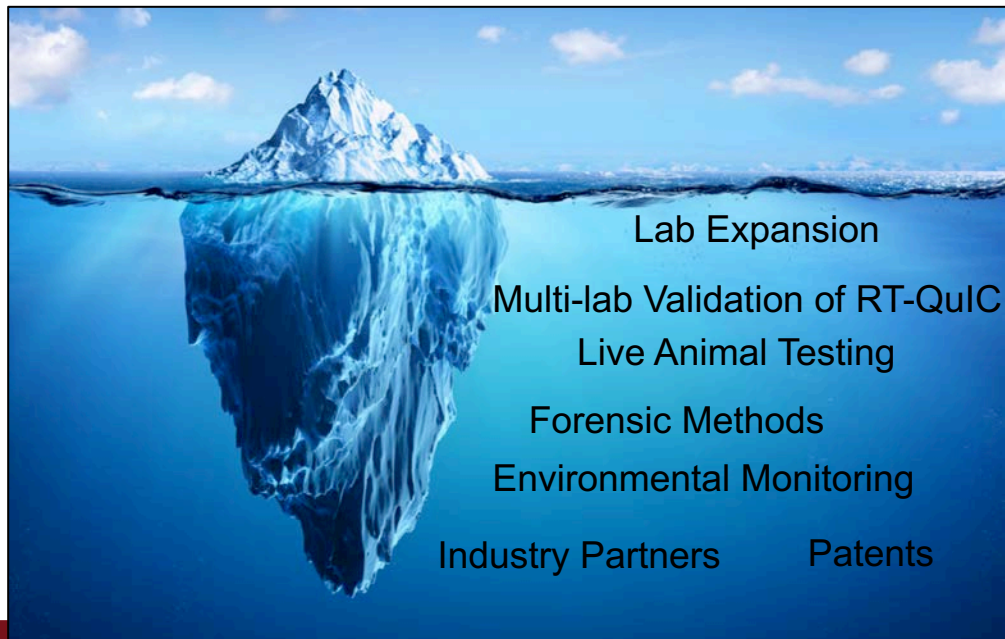
Minnesota Agricultural Experiment Station





# MNPRO has a diverse research portfolio

- Partnering with Dr. Jason Bartz (Creighton), Dr. Joel Pedersen (Johns Hopkins), and the North America CWD Research Consortium on a wide array of projects
- At least three other new diagnostic techniques hold promise (antibody engineering, microfluidics, and nanoparticles)



# Forensic Research of the Beltrami Co. Deer Carcass Dump Site



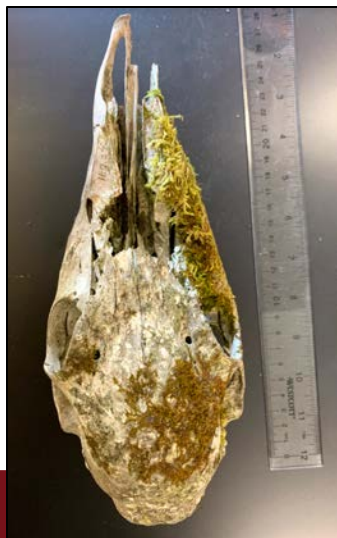
# MNPRO Research in Beltrami Co.

## – April 2021

- 3-year-old doe tested CWD+ from Beltrami cervid farm. Carcass dump-site associated with the farm discovered.

## – May 2021

- MNPRO team secures dump-site carcass remains (bones), soil, and plants for CWD testing
  - » Carcasses spread across ~10 acres by scavengers
  - » Mixture of fawns, yearlings, and adults. Can't determine how many (b/c scavengers)
  - » Identified CWD positive bones using RT-QuIC
- Herd depopulated; 13 total CWD+ deer (including fawns) on farm





# MNPRO Research in Beltrami Co.

## – June to present

- DNR fence to contain the site is erected (~15 acres)
- MNPRO secured state funds to test all recovered remains and soil from the dump site
  - ~15 bone and insect **samples** are CWD+ by RT-QulC
    - » Connective tissue, nervous tissue, bone marrow, skull rinses, maggots on bones were CWD+
    - » CWD+ across all age classes (fawns, yearlings, adults)
  - Soil core samples under CWD+ remains are positive for CWD-causing prions (independent analyses at Univ of Wisconsin)



# MNPRO Research in Beltrami Co.

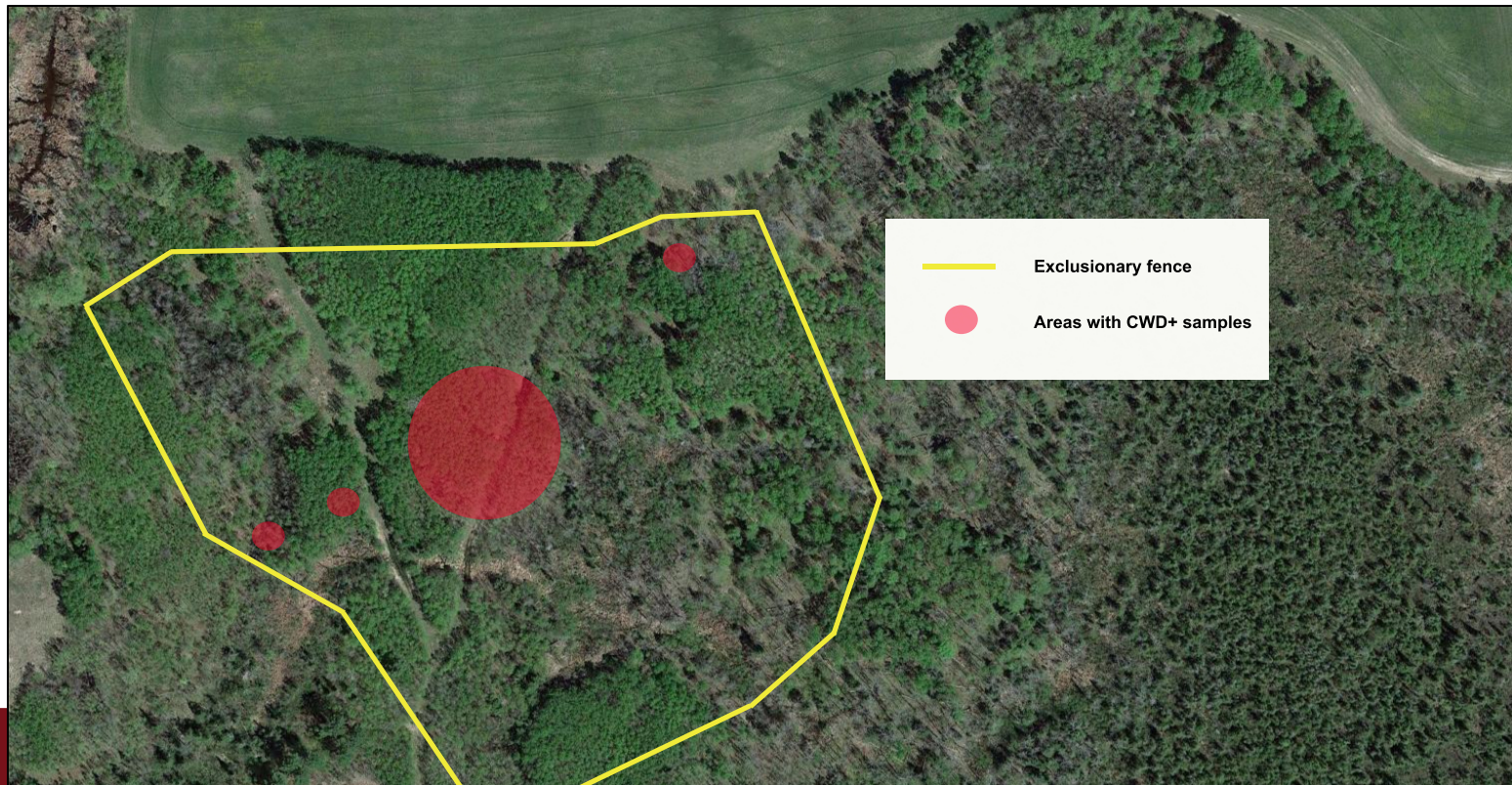
- Within the Beltrami Co. farm itself:
  - Remains from at least 9 deer were recovered during the depopulation, however these were too decomposed to test using traditional methods
  - We tested these carcasses using RT-QulC and 6 are CWD+
  - This brings the total number of deer within the fence that were CWD+ to at least 19 animals





# MNPRO Research in Beltrami Co.

- CWD prion environmental contamination across the dump site
- Heavy deer usage prior to fence construction (herd accessing farm-land, bedding down, etc.)
- Working to determine extent of contamination inside and outside of fence (soil, water, plants, dust)





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