



# Robotics in Aging

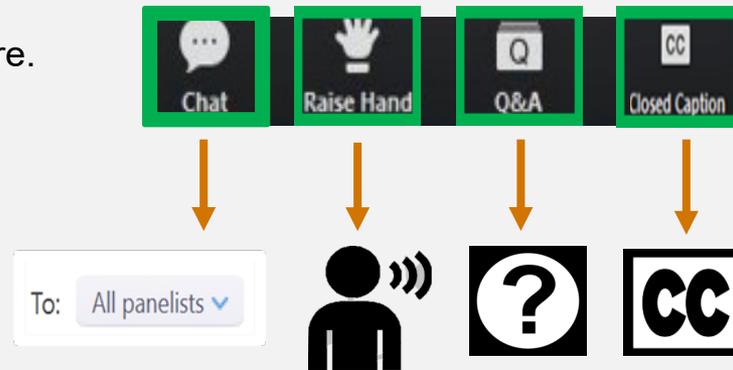
January 24, 2024

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# Webinar Objectives

- Learn about tribal outreach efforts
- Understand current and future capabilities
- Discover how this new technology can help improve lives

# David Long

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Program Analyst, Office for American Indian, Alaskan Native, and Native Hawaiian Programs  
U.S. Department of Health and Human Services

## Webinar Overview

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- Dr. Khan's background
- Media coverage
- Tribal outreach
- Current robots and capabilities
- Dr. Khan and Q&A
- Contact information

# Dr. Arshia Khan

**Professor & Director of Graduate Studies, Department of Computer Science**  
University of Minnesota, Duluth



## EDUCATION

PhD in information technology, master's degree in computer science, and bachelor's degree in computer engineering

## PUBLICATIONS

Over 140 refereed publications in high-profile journals

## EXPERIENCE

Faculty member with the University of Minnesota, Duluth, since 2008

# Media Coverage

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- PBS
- The New York Times
- National Public Radio
- Science Times
- Yahoo Finance
- Axios



**Assistive Technology and AI on Individuals with Dementia**

PBS NOVA, August 30, 2023

*YouTube*

# Tribal Outreach

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Dr. Khan has volunteered her time to help educate tribal communities about the use of robotics and artificial intelligence in aging.

## Recent onsite demonstrations:

### Little Traverse Bay Bands of Odawa Indians

*August 2023*

### Red Lake Nation

*October 2023*

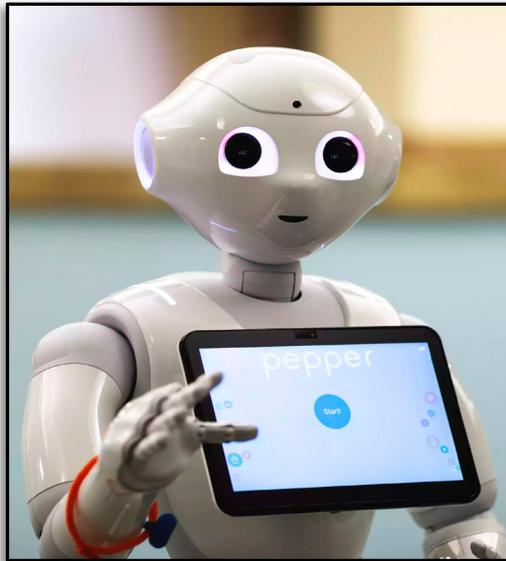


**Dr. Khan and her team visit with tribal staff.**  
Little Traverse Bay Bands of Odawa Indians, August 2023  
*Courtesy of the University of Minnesota, Duluth*

# Current Robots

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Dr. Khan has deployed 16 robots in long-term care facilities at 8 different locations.



“Pepper”



“Peri Peri”

# Social

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## Current capabilities:

- Dancing
- Performing karaoke
- Leading bingo sessions
- Announcing activities of the day
- Wishing and singing happy birthday



**Dancing with Pepper during onsite demonstration**

Little Traverse Bay Bands of Odawa Indians, August 2023

*Courtesy of the University of Minnesota, Duluth*

# Emotional

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## Current capabilities:

- Dance and laughing therapy to help improve mood
- Mindfulness-based stress reduction therapy
- Reminiscence therapy to help reduce depression



**Nursing home uses robot to help patients with dementia**

CBS Evening News, Fall 2022

*YouTube*

# Physical

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## Current capabilities:

- Yoga
- Upper and lower body exercise
- Strength training
- Relaxation
- Meditation



**Performing yoga with Peri Peri during onsite demonstration**

Little Traverse Bay Bands of Odawa Indians, August 2023

*Courtesy of the University of Minnesota, Duluth*

# Cognitive

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## Current capabilities:

- Administers cognitive assessments, as well as cognitive stimulation therapy (CST) for helping slow down cognitive decline.

*CST is an evidence-based therapy that does not require a trained therapist to be administered.*



**Cognitive stimulation therapy with Pepper during onsite demonstration**

Little Traverse Bay Bands of Odawa Indians, August 2023  
Courtesy of the University of Minnesota, Duluth

# Functional

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## Current capabilities:

- Washing face
- Brushing hair
- Brushing teeth
- Traveling from point A to B



Brushing teeth with Pepper (edited)  
*Courtesy of the University of Minnesota, Duluth*

# Nutrition

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## Current capabilities:

- The robot can talk, explain the significance of a healthy diet, and show pictures and videos of healthy food on its tablet

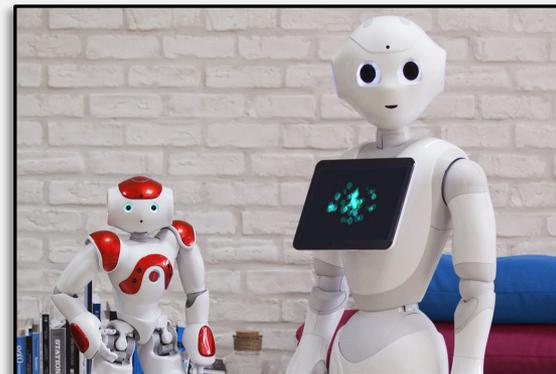


# Wearable and Spatial Sensors

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Can monitor and predict:

- Sundowning
- Exiting behavior
- Wandering
- Aggression
- Depression
- Anxiety



# Dr. Khan and Q&A

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## AGING & COST

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- Growing aging population with more people affected by dementia
- There is a greater need for augmenting care provided by human caregivers

## DEMENTIA & CULTURE

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- Increased diversity in the population of people affected with dementia (*American Indians at 1.75% higher risk than White Americans*)
- Need for cultural sensitivity in technology:
  - Robots speaking Ojibwe
  - Robots embodying cultural norms specific to the communities they serve

## FUTURE TECHNOLOGY

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- Design and development of a culturally sensitive humanoid social robot that will proactively respond, employing AI by predicting behavioral and psychological episodes using contactless sensors
- Embedding AI in robot's responsiveness

# Contact Information

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