

# Thao Phung

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## EDUCATION

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**Colorado School of Mines**, Golden, CO

*Jan 2020 - Now*

Graduate Student, Research Assistant in Computer Science

Research Interest: Human Robot Interaction (HRI), Augmented Reality (AR), Machine Learning

Advisor: Tom Williams

**University of Wyoming**, Laramie, WY

*Aug 2013 - Dec 2018*

B.S. in Computer Science

**Online Degrees, Udacity**

Bertelsmann Data Science Challenge

*May 2018 - Aug 2018*

Front-End Web Developer Nanodegree

*Apr 2018 - Oct 2018*

Intro to Self-Driving Cars Nanodegree

*Oct 2017 - Jan 2018*

Deep Learning Foundation Nanodegree

*Feb - Sept 2017*

Machine Learning Nanodegree

*Aug 2016 - Jul 2017*

## PUBLICATIONS

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1. Jared Halmilton\*, Thao Phung\*, Nhan Tran, Tom Williams. "What's The Point? Tradeoffs Between Effectiveness and Social Perception When Using Mixed Reality to Enhance Gesturally Limited Robots". In: *HRI* (2021)
2. Nhan Tran, Kai Mizuno, Trevor Grant, Thao Phung, Leanne Hirshfield, Tom Williams. "Exploring Mixed Reality Robot Communication Under Different Types of Mental Workload". In: *VAM-HRI* (2020)
3. Adam Stogsdill, Thao Phung, Tom Williams. "Investigating Confidence-Based Category Transition of Spatial Gestures". In: *HRI-NLRG* (2020)
4. Thao Phung, Anh Nguyen, Jeff Clune. "Learning to Solve Symbolic Math from Visual Inputs". In: *WiM-NIPS* (2018)
5. Thao Phung, Amy Banic. "Investigation on the Use of Perception Manipulation to Enhance Virtual Reality Training". In: *RMWCWIC* (2016)

## RESEARCH AND PROJECTS

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**A survey on Virtual, Mixed, Augmented Reality in Human-Robot Interaction**

*Feb 2020 - Now*

- Surveyed more than 400 papers on virtual, mixed, augmented reality HRI topics.

- Designed a new framework/classifier for different VAM techniques used in HRI.

**What's The Point? Tradeoffs Between Effectiveness and Social Perception When Using Mixed Reality to Enhance Gesturally Limited Robots**

*Jan 2020 - Oct 2020*

*Accepted to Human-Robot Interaction conference (HRI 2021)*

- Investigated different mixed reality gestures for armless robots to improve human-robot communication.

**American sign language (ASL) recognition using deep neural networks**

*May 2018*

*Oral presented at Wyoming Undergraduate Research Day*

- Hand-designed a training set of over 2860 videos for ASL alphabet including motion letters.

- Trained convolutional neural networks (CNNs) and recurrent neural networks (RNNs) using Python to recognize ASL hand gestures performed by different people in different lighting conditions.

- On a small, hand-generated training set, obtained 9.7% accuracy on test set, improving over the 3% accuracy obtained by random guessing.

## Learning to solve symbolic math from visual inputs

May 2017

Poster presented at CVPR 2017 and NIPS 2017 workshops

- Trained CNNs to do addition and subtraction given visual inputs of handwritten equations.
- Obtained 98% test set accuracy on new handwriting styles of previously seen equations and 15% accuracy on entirely new equations.

## Investigation on the use of perception manipulation to enhance virtual reality training

Oct 2016

Poster presented at Rocky Mountain Celebration of Women in Computing (RMCWiC) 2016

- Researched action-specific perception: how a person's perception of the environment changes in conjunction with his/her ability to act in it.
- Designed Oculus-driven golf putting simulation in Unity.

## WORK EXPERIENCE

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### Research Assistant

Jan 2020 - Now

MirrorLab, Colorado School of Mines

- Collaborated with a diverse group of robot and cognitive science labs on several research projects.

### Library Technical Assistant

Oct 2016 - July 2019

Coe Library, University of Wyoming

- Learned how to professionally handle and prepare fragile fossil specimens for 3D digitization using HP 3D Scan with structured light scanning technology and Clearform's Portable 3D Scanner.
- Processed more than 450 digital objects in different formats to be delivered via web; assisted with deployment and visualization of 3D objects on mobile devices.
- Developed a user-friendly, interactive web presentations of high-resolution 3D models.

### Research Assistant

Evolving AI Lab, University of Wyoming

Dec 2016 - Dec 2018

3DiA Lab, University of Wyoming

Apr 2015 - Dec 2016

- Collaborated with a diverse group of graduate students on several research projects, resulting in two presentations at major conferences.
- Presented research papers and offered advice on other research projects during weekly lab meeting.

## TECHNICAL SKILLS

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- Extensive experience developing machine learning applications in Python using sikit-learn and Keras libraries.
- Fluent in developing solutions to classification problems via regression, clustering, and deep learning in Python.
- Familiar with using Caffe and Tensorflow frameworks to perform research in artificial intelligence.
- Comfortable operating Linux, Mac OS X, and Windows operating systems.
- **Languages and Software:** Python, C++, Java, C#, HTML, CSS, Microsoft Office, Adobe Photoshop
- **Statistical Methods:** regression models, dimensionality reduction, Bayesian statistics

## COURSE WORKS

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- Computer Vision
- Machine Learning
- Artificial Intelligence
- Data Mining
- Linear Algebra

## GRANTS AND FELLOWSHIPS

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- Women in Machine Learning at NIPs travel award: \$300 Dec 2017
- Women in Computer Vision at CVPR travel award: \$900 Jul 2017
- Wyoming Research Scholar Program grant: \$500 Jul 2017
- EPSCoR Research Fellowship: \$1,600 Oct 2015 - May 2016

## AWARDS AND SCHOLARSHIPS

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- |   |                            |
|---|----------------------------|
| - Bertelsmann Data Science Challenge Scholarship                  | <i>May 2018 - Aug 2018</i> |
| - Grow with Google Front-End Web Developer Nanodegree Scholarship | <i>Apr 2018 - Oct 2018</i> |
| - Grow with Google Challenge Scholarship: Front-End Web Dev       | <i>Jan 2018 - Apr 2018</i> |
| - Lyft Intro to Self-Driving Cars Scholarship: \$800              | <i>Oct 2017 - Jan 2018</i> |
| - 3rd Best Poster Presentation at RMCWiC                          | <i>Sept 2016</i>           |
| - International Student Scholarship: \$1,000                      | <i>Aug 2014 - May 2015</i> |
| - Rocky Mountain Scholars Award: \$22,000                         | <i>Aug 2013 - May 2017</i> |

## PRESENTATIONS

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### Poster Presentations

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|---|---------------------------|
| - <b>Women in Machine Learning (WiML) in conjunction with NIPs</b>                      | <i>Dec 2017</i>           |
| Learning to solve symbolic math from visual inputs                                      | <i>Long Beach, CA</i>     |
| - <b>Women in Computer Vision (WiCV) in conjunction with CVPR</b>                       | <i>Jul 2017</i>           |
| Learning to solve symbolic math from visual inputs                                      | <i>Honolulu, HI</i>       |
| - <b>Rocky Mountain Celebration of Women in Computing (RMCWiC)</b>                      | <i>Sept 2016</i>          |
| Investigation on the use of perception manipulation to enhance virtual reality training | <i>Salt Lake City, UT</i> |

### Oral Presentation

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|---|--------------------|
| - <b>Research Day, University of Wyoming</b>  | <i>Apr 2018</i>    |
| American Sign Language Recognition with Microsoft HoloLens                              | <i>Laramie, WY</i> |
| - <b>Research Day, University of Wyoming</b>  | <i>May 2016</i>    |
| Investigation on the use of perception manipulation to enhance virtual reality training | <i>Laramie, WY</i> |

## SERVICES AND ACTIVITIES

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### Reviewing

- Workshop papers: WiML2017

## LANGUAGES

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|------------|----------------|
| Vietnamese | Native speaker |
| English    | Proficient     |