Mark V. Kocherovsky

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Education:

Michigan State University (MSU), East Lansing, MI 8/22-present:

- **Third-Year PhD student, Department of Computer Science and Engineering, GPA of 4.0/4.0**.

Lawrence Technological University (LTU), Southfield, MI 8/17 - 5/22**:**

- **BSCS with minors in Physics and Mathematics, May 2021, GPA of 3.91/4.0**, graduated *summa cum laude*.
- **MSCS** with a **GPA of 4.0/4.0**, **May 2022**.

Work/Research Experience:

Banzhaf Lab Research Assistant, MSU, MI 11/22 - present:

- Explored differences in search between linear and cartesian genetic programming, paper accepted to ALife 2024
- Working on Protein Optimization Engineering Tool (POET) to help bioengineers find effective proteins for given tasks. Supported by NIH grant, currently undergoing renewal.

Natural Sciences Department/Student Worker, LTU, MI 9/19 - 5/22:

- Developed programs to analyze data gathered from particle collision simulations and display the analyses graphically, supported by NSF grant PHY-1913005 (PI: Dr. George Moschelli). Co-authored paper for publication (see "Published Research").
- Presented work at the 2021 Meeting of the American Physical Society Division of Nuclear Physics.

MSCS Projects, LTU, MI, 8/21-5/22:

- Worked on a team to make a neural network system on an autonomous vehicle (AV) to enable human users to give commands to the AV using hand gesture recognition (see "Published Research").
- Part of the winning team at the Intelligent Ground Vehicles Competition 2022.
- Worked on a team developing a system to steer an autonomous vehicle on unmarked roads using deep learning.
- Developed a neural network using evolutionary strategies to solve the two-class spiral problem.

NSF REU Teaching Assistant, LTU, MI 5/22-7/22:

- Help to teach and guide eight undergraduates working to test lane-following algorithms for autonomous vehicles, supported by NSF grant 2150292 (PI: Dr. Chan-Jin Chung).
- Solved technical issues outside of the program's scope and worked to ensure student safety.

Robofest/Student Worker, LTU, MI 9/17 - 6/20:

- Participated in and co-authored conference proceedings for two research projects (see "Published Research").
- Worked on controlling a miniature electric car through a computer interface.

Intern, KUKA North America, MI, 7/20-8/20

- Prepared documentation and tested code for the control unit of a robotic warehouse management system.

Senior Projects, LTU, MI, 8/20-5/21

- Wrote a program to analyze data gathered from relativistic heavy-ion collision simulations to compare the detection of "jets" using alternative machine learning algorithms; PI supported by NSF grant PHY-1913005.
- Created an extension for the Scratch 3.0 programming environment that allows a user to import a JavaScript neural network for use in their program. This project won 3rd Best Research Poster at LTU Research Day 2021 in collaboration with Dr. Chan-Jin Chung: https://bit.ly/3wZoQVC

Selected Research:

- Schulte, Joseph, et al. "2D and 3D Pose Estimation for Gesture Recognition in Deep-learning-driven Human–vehicle Leader–follower Systems." Autonomous Vehicles and Systems. River Publishers, 2024. 113-142.
- "Human-Vehicle Leader-Follower Control using Deep Learning-Driven Gesture Recognition", published by the MDPI Journal of Vehicles (https://doi.org/10.3390/vehicles4010016)
- Kocherovsky, Mark, et al. "Autonomous Vehicle Steering through Convolutional and Recurrent Deep Learning." Autonomous Vehicles and Systems. River Publishers, 2024. 83-111.

- "CS+PA^2: Learning computer science with physical activities and animation — A MathDance experiment", published by the Institute of Electronic and Electrical Engineers (IEEE) at the IEEE Stem Education Conference (ISEC) in March 2018. https://doi.org/10.1109/ISECon.2018.8340497
- "Complementary Two-Particle Correlation Observables for Relativistic Nuclear Collisions", submitted to Physical Review C, published in 2023, and presented at MIT DNP 2021. https://arxiv.org/abs/2110.04884

Programming Languages:

- C++ (strong)
- Python (strong)
- MySQL (intermediate)
- Java (intermediate)
- C# (intermediate)
- JavaScript (intermediate)
- R (intermediate)
- Haskell (intermediate)

Key Libraries, Platforms, and Other Programming Skills:

- Numpy, Pandas, Pickle, ROOT, scikit-learn, matplotlib
- Tensorflow/Keras
- Robotics Operating System
- Deep Learning
- Vim
- Genetic/Evolutionary Algorithms

Other Information:

- President/Co-President of the LTU Society of Physics Students (8/19 - 5/22).
- Native English, Intermediate Russian, Intermediate German, and basic Spanish.
- Amateur Photographer
- GitHub: https://github.com/MarkKocherovsky
- Google Scholar: https://bit.ly/3vET3c4