**Dylan Colli**

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**Education**

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| MS in Robotics  University of Michigan  GPA:3.80 | Expected Graduation: May '24 |
| BS in Chemical Engineering*, summa cum laude*  University of Kentucky | May '18 |

**Relevant Employment/Research History**

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| ***Univ. of Michigan ARM Lab | Graduate Research Assistant*** | Aug '22 - Current |
| *Machine Learning, PyTorch, C++, ROS, Bayesian Filters, Optimization* | Ann Arbor, MI |
| * Implemented deformable object tracker in PyTorch that utilizes differentiable convex optimization (CVXPYLayers) and simulation (NVIDIA Warp) layers. | |
| * Utilizing this real-time tracker for self-supervised online learning of deformable object dynamics, enabling long-horizon planning compared to neural network approaches. | |
| * Leading team of 3 engineers developing a Spot robot framework for agricultural robotics. | |
| ***Qualcomm (Arriver, acquired Apr. 2022) | Algorithm Engineer*** | Jan '21 - Jun '22 |
| *C++, Python, Agile, Sensor Fusion, Target Tracking* | Ann Arbor, MI |
| * Collaborated in the development of vehicle, static object, and pedestrian tracking module that fused radar and camera data via the Cubature Kalman Filter. | |
| * Decreased module runtime by 7%, restoring the 50 Hz runtime requirement, via proposal and implementation of coordinate transform caching in collision detection routine. | |
| * Architected and implemented KPI exploration/visualization tool used in seven person team. | |
| ***Loyola Univ. Chicago | Research Assistant (Remote)*** | Jul '20 - Dec '20 |
| *Python, Technical Writing* | Ann Arbor, MI |
| * Improved parallelization of in-house genetic algorithm through test-driven development. | |
| * Served as the lab's manuscript editor and consulted on software best practices. | |
| ***Univ. of Kentucky | Research Assistant*** | Aug '19 - Jul '20 |
| *C++, Python, Non-Convex Optimization, Blender* | Lexington, KY |
| * Prototyped and co-authored FiberSim, a numerical model of contraction in heart cells. | |
| * Used GoogleTest for test-driven development of RapidJSON C++ integration for model I/O. | |
| * Developed data visualization/animation tool using Blender's Python API. | |
| ***Univ. of Kentucky | Research Assistant, Computer Vision Lead*** | Oct '16 - Jul '19 |
| *Python, OpenCV, Event/Feature Detection, Linux* | Lexington, KY |
| * Developed/published MatchedMyo package for classification of cardiac cellular remodeling. | |
| * Developed/published algorithm for cellular signaling event detection and quantification. | |
| * Advised 4 teammates on the application of classical CV techniques in physiology research. | |

**Projects And Selected Publications**

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| **Deformable Object Tracking for Garments** | *Deep Learning, Object Tracking, Simulation* |
| [github.com/dcolli23/garmentnets\_tracking](https://github.com/dcolli23/garmentnets_tracking) |  |
| * Extended single-prediction GarmentNets pose estimation model to track garment pose. | |
| * Utilized a differentiable filter approach, incorporating learned dynamics using PointNet++. | |
| * Developed manipulated garment simulation framework leveraging Blender's Python API. | |
| **MatchedMyo** | *Python, Feature Detection, OpenCV* |
| [bitbucket.org/pkh\_lab/matchedmyo\_git](https://bitbucket.org/pkh_lab/matchedmyo_git) | [doi.org/10.1016/j.bpj.2019.03.010](https://doi.org/10.1016/j.bpj.2019.03.010) |
| * Developed and published classical computer vision package for detecting and quantifying the various modes of structural cell remodeling elicited by heart failure. | |
| **Quantifying Cardiac Cellular Signaling** | *Python, Event Detection* |
| [github.com/dcolli23/spark\_analysis](https://github.com/dcolli23/spark_analysis) | [doi.org/10.1113/JP277360](https://doi.org/10.1113/JP277360) |
| * Developed/published algorithm to detect and quantify cell signaling in microscopy videos. | |