NATHANIEL J. KAISER

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PROFILE Experienced professional with 5+ years in industry. Extensive knowledge of electro-mechanical systems from core engineering concepts to high-level system design. Currently pursuing a Master's Degree in Robotics with career ambitions to develop complex robotic systems in a fast-paced and challenging environment.

EDUCATION *Masters of Science in Robotics, Northwestern University* **(9/2016 – Present)**
- GPA: 3.94/4.00, expected graduation: December 2017
- Areas of focus: autonomy, navigation, localization and planning, SLAM, machine learning, AI, computer vision, sensing and perception, controls, embedded systems, mechatronics
- Relevant projects and coursework can be found at: njkaiser.github.io/portfolio

Bachelors of Science in Mechanical Engineering, Iowa State University **(8/2007 – 5/2011)**
- GPA: 3.79/4.00, graduated with distinction: *magna cum laude*
- Deeply involved in co-curriculars, student clubs, and technical projects

SKILLS **Software Development:** C/C++, Python, Git/GitHub, Linux, Matlab/Simulink
Robotics-related: ROS, OpenCV, PCL, Navigation Stack, IKFast, RViz, Gazebo, OpenRAVE
CAD/CAM: Creo Parametric, Pro/Engineer, SolidWorks, Inventor, Fusion 360, AutoCAD
General: Microsoft Office, Visual Basic for Applications
Certifications: Six Sigma Green Belt certified through Caterpillar (June 2013)

EXPERIENCE *Robotic Software Development Intern, NASA Jet Propulsion Laboratory* **(6/2017 – 9/2017)**
- Developed control software for testing force-torque sensor for Mars 2020 rover robotic arm
- Implemented joint-level arm control and IK solution, integrated into existing codebase
- Scripted simulator using OpenRAVE and created generalized framework for use in future projects

Design Engineer, Caterpillar Inc. - Advanced Electric Drive Systems **(6/2011 – 9/2016)**
- Revolutionized Caterpillar's product line by developing electromechanical drivetrain systems and components and integrating into a diverse portfolio of mining and construction equipment
- Ideated and championed new and innovative designs from initial concept to production launch
- Managed design activities within a cross-functional team and collaborated with several external supporting groups to maintain rigorous and dynamic schedules
- Pioneered new methodology for life improvement: employed analytical methods to pinpoint root causes of field failures and gain a deeper understanding of product issues affecting system life
- International experience supporting and vetting dealer facilities onsite (South America)

PROJECTS *Computer Vision* – devised vision algorithm to estimate robot pose using optical flow and sensor fusion, implemented on real robot using ROS and OpenCV in C++

Autonomous Navigation – configured differential drive robot and LIDAR unit, wrote custom software for point cloud filtering, and integrated with ROS Navigation Stack for autonomous navigation

Deep Learning for Vision – used TensorFlow to build, train, and validate a Convolutional Neural Network to detect cancer nodules in a large medical database of 3D lung images

Machine Learning & Artificial Intelligence – series of mini-projects designing a diverse set of algorithms in Python, testing on real robot data, and comparing results with other algorithms

Team PrISUm Mechanical Director – managed Mechanical Team of student-run organization which designs, builds, and races solar-powered electric vehicles

CNC Router Table Project – conceptualized, designed, built, and tested a homemade CNC router table from scratch over the course of 2 years