

# David Knight Software Engineer

david@dvshkn.com ✉  
http://dvshkn.com/ 🌐  
dvshkn 📧

## PROGRAMMING

Current Use  
Java, Python, Javascript  
Prior Use  
C, C++, MATLAB

## TECHNOLOGIES

Current Use  
Amazon Web Services, Boto,  
XStream, node.js  
Prior Use  
OpenCV, Android, WebGL, LIBSVM,  
Hadoop, Atmel AVR, Qt Framework

## CLOUD SERVICES

Simple Workflow, S3, SimpleDB, EC2,  
GovCloud, CloudFront, Route 53

## ACADEMIC INTERESTS

Visual Search, Data Visualization,  
Machine Learning

## GRADUATE COURSES

Image Processing, Computer Vision,  
Applied Vision and Image Systems,  
Machine Learning, Database System  
Principles

## SUMMARY

- » Experience developing for a variety of platforms ranging from cloud systems to microcontroller firmware
- » Previously delivered cloud-based data processing services for both Mars rover tactical operations and public outreach
- » Seeking opportunities to develop algorithmically challenging applications that operate on large scientific datasets

## WORK EXPERIENCE

9.2011–Present **NASA Jet Propulsion Laboratory, Caltech**

Ops Lab Software Engineer

Curiosity Mars Rover, Ground Data Processing

- » Lead development and deployment of mission-critical image ingestion and processing pipeline for Mars rover operations software suite
- » Refactored pipeline codebase and performed Amazon SWF API migration without disruption to mission operations

Curiosity Mars Rover, Public Outreach Automation

- » Architected, developed, and deployed data pipeline to automatically release rover imagery and telemetry data to the Curiosity Raw Images Gallery, NASA's Explore Mars web apps, and other data consumers
- » Implemented scalability improvements to reduce server load on the JPL Mars Exploration Program websites in anticipation of increased traffic for Curiosity's landing on Mars

Cloud Computing Working Group, Scientific Viability Exploration

- » Established viability of commercial cloud for NASA projects by benchmarking Amazon EC2 vs. NASA internal resources
- » Demonstrated performance competitiveness of cloud clusters by registering 12 TFLOPS in Linpack across 64 cc2.8xlarge instances
- » Achieved roughly 25% computational performance of a 2011 TOP500 supercomputer for under \$70/hr

6.2011–9.2011 **Inspire Medical Startup, Stanford D.School**

Electronics Designer

- » Designed and built PWM pump controller circuit and battery charging circuit for prototype bubble CPAP machine targeted towards the developing world

6.2010–8.2011 **NASA Jet Propulsion Laboratory, Caltech**

Software Development Intern

- » Developed WebGL-based terrain visualizer for the Lunar Mapping and Modeling Project (LMMP) to render elevation maps of the moon's surface in 3D
- » Visualizer later used by senior engineers as part of LMMP demo for NASA HQ

## EDUCATION

2009–2011 **M.S. in Electrical Engineering**

Stanford University

Emphasis on Computer Vision and Software Systems

2004–2009 **Honors B.S. in Electrical Engineering**

Oregon State University

Emphasis on Signal Processing and Wireless Communication

Thesis — *Implementing a Wireless Accelerometer Network for Tsunami Simulations*

## PROJECTS

2010–2011 **Kinect Hand Pose Recognition**

2 Person Group

- » Implemented discriminative method in MATLAB to identify open and closed hand poses from localized Kinect image patches

2010 **Android Plant Leaf Identification App**

2 Person Group

- » Prototyped an Android application trained to discriminate between different kinds of plant leaves in order to provide an offline nature reference for hiking
- » Implemented many MATLAB image processing toolbox functions in Java

2007–2009 **Wireless Accelerometer Network for Tsunami Simulations**

4 Person Group

- » Wrote Atmel ATmega microcontroller functionality in C to operate a wireless transceiver chip
- » Developed C++ GUI client to allow a PC with a USB RF module to communicate with the microcontroller boards

## PUBLICATIONS

(Accepted, Withdrawn Due to Funding) Feeding People's Curiosity: Leveraging the Cloud for Automatic Dissemination of Mars Images

David Knight, Mark Powell, Khawaja Shams  
*IEEE Aerospace Conference*, 2013

Evaluating the Efficacy of the Cloud for Cluster Computation

David Knight, Khawaja Shams, George Chang, Tom Soderstrom  
*IEEE Aerospace Conference*, 2012