

# Jacob Senecal

✉ senecaljacob@gmail.com

☎ 406-475-4242

🌐 jacobsenecal.com

📦 bitbucket.org/jsene

## Education

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### Montana State University

M.S. Computer Science, GPA 3.97 // Aug 2017 – May 2019 (expected graduation)

B.S. Mechanical Engineering, GPA 3.95 // 2013 – 2016

## Experience

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### Graduate Research Assistant – Numerical Intelligent Systems Laboratory

Aug 2017 – Present

- Assessing feasibility of applying machine learning to monitor produce (fruits, vegetables) for Intel Corporation
- Developing predictive analytics using hyperspectral imaging and machine learning
- Built pipeline to clean, format, and ingest data for model training

### Software Engineer – Blackmore Sensors & Analytics

June 2018 – Present

- Implementing algorithms for real time segmentation of streaming point cloud data
- Built production software to automate LiDAR calibration on automotive systems
- Designed a custom machine learning model to extract features from large point cloud datasets
- Prepared technology demonstrations for clients and media (see article in WIRED Magazine, [www.wired.com/story/blackmore-doppler-lidar-self-driving-cars/](http://www.wired.com/story/blackmore-doppler-lidar-self-driving-cars/))

### R&D Engineer – Los Alamos National Laboratory

Jan – Aug 2017

- Created laser-ultrasound diagnostic system for \$60,000 lower cost than previously used system
- Produced data analysis tools for automated feature detection within large datasets from real time manufacturing operations

### Mechanical Engineer – Los Alamos National Laboratory

June – Aug 2016

- Developed material damage model to predict failure in qualification testing
- Performed data acquisition, and signal processing to validate the new model

### Research Assistant – Fluids & Computations Laboratory

2015 – 2016

- Analyzed performance of new algorithms simulating multiphase flow problems
- Converted 2D multiphase Fortran-90 code to 3D
- Programmed 3D incompressible flow solver in MatLab

## Skills

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**Programming Languages:** Python, Java, C++, MatLab, SQL, JavaScript, HTML, CSS, Fortran-90, LabVIEW

**Libraries:** Tensorflow, PyTorch, Scikit-Learn

**OS:** Linux, MacOS, Windows

**Frameworks & Tools:** Git, Flask

## Publications

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**Senecal, J.**, Vannoy, T., Strnadova-Neeley, V., (submitted) "Improved Subspace K-Means Performance via a Randomized Matrix Decomposition." *Proceedings of the 42<sup>nd</sup> Annual International ACM SIGIR Conference on Research and Development in Information Retrieval*. ACM.

**Senecal, J.**, Sheppard, J., (submitted) "Efficient Convolutional Neural Networks for Multi-Spectral Image Classification", *2019 International Joint Conference on Neural Networks*, Budapest, Hungary.

Logan, R., **Senecal, J.**, Walton, N., Scherrer, B., Peerlinck, A., Sheppard J., Shaw, J. (2018) "Using Hyperspectral Imaging and Machine Learning to Monitor Grocery Store Produce", *Optical Science and Engineering Conference*, Bozeman, MT.

Owkes, M., Cauble, E., **Senecal, J.**, & Currie, R. A. (2018). Importance of curvature evaluation scale for predictive simulations of dynamic gas–liquid interfaces. *Journal of Computational Physics*, 365, 37-55.

**Senecal, J.**, Jarque, A., Flynn, E. (2017). "Compact Laser Ultrasound System for Non-Destructive Evaluation", *11<sup>th</sup> Meeting of the International Workshop on Structural Health Monitoring*, Palo Alto, CA.

Prisbrey, M., **Senecal, J.**, Sethi, M., Haynes, C., Taylor, S. (2017). "Equating Severity in Qualification Testing", *35<sup>th</sup> Meeting of the International Modal Analysis Conference*, Garden Grove, CA.

**Senecal, J.**, Owkes, M. (2016). "Optimal Scale for Curvature Calculations in Multi-Phase Flows", *69<sup>th</sup> Meeting of the APS Division of Fluid Dynamics*, Portland, OR.

## Activities

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### AUVSI Robosub Competition

- Invented robotic arm capable of opening doors and picking up objects
- Integrated design with electrical system
- Developing object detection system

## Study Abroad

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### Chonbuk National University

May 2017 // Jeonju, South Korea

- Studied cyber-physical systems and structural health monitoring techniques

## Service & Leadership

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### Engineering Ambassador

2015 – 2016 // Montana State University

- Elected by Montana State faculty to represent the College of Engineering to potential donors, advisory board members, and prospective students

### Engineers Without Borders

2014 – 2016 // Kwhisero, Kenya

- Constructed water supply and filtration system for school of 500 students