

# CARLYN LEE

## EXPERIENCE

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### **Jet Propulsion Laboratory, California Institute of Technology**

*Applications Software Engineer*

August 2012 - Present

*Pasadena, CA*

- Enabled concurrent simulations of Serially Concatenated Pulse-Position Modulation on Cray XC40 supercomputer and simulated bit error rates as low as 10e-9. Integration and development of Link Performance & SNR calculation and Data Volume modeling tools for concurrent link analyses in M2020 Relay Telecom Predictor.
- Communications support for collaborative multi-agent autonomy in maritime and subterranean environments. V&V for software on networked Raspberry Pi's and unmanned surface vehicles. Trade studies and implementation of radio mesh network in mining tunnel, which improved robot localization in GPS/comm deprived environments, and resulted in 1st place in DARPA's Subterranean Challenge Urban Circuit.
- Developed intelligent interfaces for DSN operators and telecom engineers to plan and execute telemetry, tracking, command, and monitoring of spacecraft. Implemented framework for Link Complexity and Maintenance software to query events & trends from Sequence of Events files and estimate a link complexity profile, which increased the efficiency of support to NASA deep-space missions. Architected data delivery systems for COTS dashboards which enables operators to explore aggregated data and event anomalies flagged by rules-engine, Event Verification Records & Engineering Housekeeping, and Accountability data. e.g. Tableau & Web Data Connectors, Kibana.
- Telecom forecast prediction tools for various deep space missions, including full web stack development for SaaS application prototype. Implementation of network link models. Spacecraft, planetary, camera-matrix, and events analysis using C/C++. UX development for scheduling telecom links, e.g. Liferay portlet, Drupal, D3, WebGL.
- Modeling of communications traffic flow for human exploration of Mars & Moon. Python implementation of Markov model for estimating bandwidth requirements in Deep Space Network simulations.
- Radio science operator for Cassini Spacecraft. Investigation of atmospheric losses for 32GHz radio communications recorded on Deep Space Network open & closed loop receivers. Prototyped data warehouse for quick visualization of radio science data from Cassini Spacecraft during 2004-2015.

### **Spectral Imaging Laboratory**

*Consultant*

November 2011 - Present

*Pasadena, CA*

- Post-processing algorithm to correct for manufacturing inconsistencies in prototype of artificial compound eye.
- Application of super resolution algorithms to ray-traced simulations of images captured with artificial compound eyes. Using Matlab and openCV, improved resolution of images degraded with noise models.
- Modeling of visual acuity for multiple apertures on curved surface. Implementation of neural networks to improve angular resolution of a point light source.

### **California State University, Fullerton**

*Research Assistant & Intern*

December 2009 - August 2012

*Fullerton, CA*

- Designed and implemented framework to improve run-time efficiency & accuracy of cancer detection using eigen decomposition of DNA microarray data with large feature set.
- Implemented framework to explore next generation sequencing alignment techniques for discovering binding sites in heat-shock proteins, integration of C/C++ self-organizing maps.
- Delivered scheduling tool for library resources using .NET framework. C# student web application, VB.NET admin configuration tool. Database design & implementation using SQL Server & stored procedures.

## EXTRACURRICULAR, VOLUNTEER & PROFESSIONAL AFFILIATIONS

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Interplanetary Small Satellite Conference Committee; Caltech Alpine Club Website Administrator; Private Pilot-ASEL +300hrs including instruction in PA28, C152, C172, CT210M; Technician Class Amateur Radio Operator  
**2019** Member of Duarte Ad Hoc Finance Advisory Committee, appointed by Duarte City Council  
**2010 - 2012** Vice-President of Association for Computing Machinery, CSU Fullerton.

## AWARDS & HONORS

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**2015** 3rd place Topcoder Open Finals API Hackathon.

**2013** 1st place Biotech Track, 15th Annual IEEE Biomedical Engineering Biotech Contest.

**2012** Anita Borg Scholarship, CSUPERB Travel Grant, Orange County Outstanding Engineering Student Award.

## EDUCATION

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**California State University, Fullerton**

M.S. Computer Science

B.S. Computer Science, Minor in Mathematics

*August 2012*

*July 2011*

## PUBLICATIONS

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D. Abraham, B. MacNeal, D. Heckman, Y. Chen, J. Wu, K. Tran, A. Kwok and C. Lee. Recommendations Emerging from an Analysis of NASA's Deep Space Communications Capacity. In International Conference On Space Operations (SpaceOps 2018), Marseille, France, May 2018.

J. Lad, M. Johnston, D. Tran, D. Brown, K. Roffo, C. Lee. Complexity-Based Link Assignment for NASA's Deep Space Network for Follow-the-Sun Operations. In International Conference On Space Operations (SpaceOps 2018), Marseille, France, May 2018.

K. Pinover, M. Johnston, C. Lee. Optimizing SmallSat Scheduling for NASA's Deep Space Network. In International Workshop on Planning and Scheduling for Space (IWPSS 2017). Pittsburgh, PA, June 2017.

D. Morabito, D. Kahan, K. Oudrhiri, and C. Lee. Cassini Downlink Ka-Band Carrier Signal Analysis. The Interplanetary Network Progress Report, Volume 42-208, February 15, 2017.

K. Cheung, D. Abraham, M. Sanchez-Net, K. Tran, C. Lee. Traffic modeling for Deep Space Network in the Human Exploration Era. In SpaceOps 2016 Conference, Daejeon, Korea, May 16-20, 2016.

M. Johnston, C. Lee, C. Lau, K. Cheung, M. Levesque, B. Carruth, A. Coffman, M. Wallace. Integrating space communication network capabilities via web portal technologies. In SpaceOps 2014 13th International Conference on Space Operations, Pasadena, California, May 5-9, 2014.

C. Lee, C.H. Lee. Cancer Screening Using Multi-modal Differential Principal Orthogonal Decomposition. In 2013 13th International Conference on Computational Science and Its Applications, Ho Chi Minh City, Vietnam, June 24-27 2013.

C. Lee. Rest architecture for link analysis tools portal. NASA Undergraduate Student Research Program (USRP), Pasadena, California, August 2011.