CARLYN LEE

EXPERIENCE

Jet Propulsion Laboratory, California Institute of Technology August 2012 - Present
Applications Software Engineer *Pasadena, CA*

- Parallelized Deep Space optical link channel coding simulations for ranges 0.25 AU - 1AU on Cray XC40, which enabled signal and noise trade-space exploration in bit error rate regime of 10e-8. Developed az-el terrain mask algorithm on Cray XC40 to analyze Lunar Orbiter Laser Altimeter data in high fidelity communications link coverage mapping. Developed and integrated link performance & SNR calculation and data volume modeling tools in python for concurrent link analyses in Mars 2020 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. Radio mesh network trade studies in mining tunnel contributed to 1st place in DARPA's Urban Circuit Subterranean Challenge. Ultra-wide band ROS integration to improve robot localization in GPS/comm deprived environments.
- Developed intelligent interfaces for DSN operators and telecom engineers to support to NASA deep-space missions. Implemented Link Complexity and Maintenance endpoint from events & trends based on Sequence of Events files and modeled link complexity profile. Architected data delivery systems for DSN downlink streams to reduce rover operator response-time to requirement of 20 minutes. Using Tableau WDC & Kibana, aggregated data and event anomalies flagged by rules-engine and spacecraft housekeeping data.
- 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 November 2011 - Present
Consultant *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 December 2009 - August 2012
Research Assistant & Intern *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.
- Developed 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

Interplanetary Small Satellite Conference Committee; Caltech Alpine Club Website Administrator.
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.

CERTIFICATIONS

Adult and Pediatric First Aid/CPR/AED, The American Red Cross (Certificate ID 00ISKSO).
Technician Class Amateur Radio Operator.
Private Pilot-ASEL +300hrs including instruction in PA28, C152, C172, CT210M.

EDUCATION

California State University, Fullerton
M.S. Computer Science *August 2012*
B.S. Computer Science, Minor in Mathematics *July 2011*

PUBLICATIONS

Hook, Joshua & Seto, William & Nguyen, Viet & Hasnain, Zaki & Lee, Carlyn-Ann & Gallagher, Liam & Halpin-Chan, Tyler & Varahamurthy, Varun & Angulo, Moises. (2022). Swarms of Pirates: Red Team Exercises Using Autonomous High-Speed Maneuvering Surface Vessels. Field Robotics. 2. 872-909. 10.55417/fr.2022029.

A. Agha et al.. NeBula: Quest for Robotic Autonomy in Challenging Environments; TEAM CoSTAR at the DARPA Subterranean Challenge. Journal of Field Robotics, 2021.

C. Lee, H. Xie, C.H. Lee, D. Lyakhov, and D. Michels. In Silico Methods for Space System Analysis: Optical Link Coding Performance and Lunar Terrain Masks. In AIAA ASCEND, Las Vegas, NV, 16-18 Nov. 2020.

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, and 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, C.H. Lee. Extended Principal Orthogonal Decomposition Method for Cancer Screening. International Journal of Bioscience, Biochemistry and Bioinformatics vol. 2, no. 2, pp. 136-141, 2012.

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