

# KEVIN GRIMES

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Senior software engineer at NASA Jet Propulsion Laboratory supporting the Mars 2020 IDS project as technical lead and systems engineer. Graduated with a Master of Science degree in computer science from the University of Southern California, and with a Bachelor of Science degree in mathematics from Evangel University. Experienced in designing, architecting, and leading implementation of complex, mission-critical software systems in high-pressure environments.

## SKILLS

**PROGRAMMING LANGUAGES:** Go, Java 12, Python, Bash, JavaScript, C++

**TECHNOLOGIES:** AWS, Docker, Kubernetes, Flagger, Istio, FluxCD, Terraform, ELK stack, Apache Solr, Linux, Github, Cameo System Modeler, Ansible

**OTHER SKILLS:** Cloud-native application development, microservice architectures, event-driven architectures, software cost estimation, agile software development, object-oriented programming, team leadership, technical writing, requirements engineering, SysML modeling, public speaking, crisis management, linear algebra, image processing

## WORK EXPERIENCE

**DEPUTY FOR DEVELOPMENT & SYSTEMS ENGINEER** / July 2021 - present

Mars 2020 GDS Instrument Data System (IDS)

- o Responsible for the successful delivery and operation of IDS's suite of mission-critical tools, including its image processing PCS, visualization platforms, and rover localization APIs
- o Serves as primary technical interface with customers across the Mission System: triaging customer requests, prioritizing developer time, interpreting customer requirements, and presenting software solutions
- o Oversees a development team of about 15 people
- o Presents status at project software gate reviews (ISR, ICR, SDR, etc.)
- o Investigates software anomalies and oversees their resolution, from verification and analysis to corrective action implementation

**TOOL DEVELOPMENT LEAD** / September 2018 - 2023

Mars 2020 GDS IDS Pipeline & PLACES

- o Delivers the IDS Pipeline PCS, a suite of over 100 processing pipelines that, every sol, generates hundreds of gigabytes of image data critical for rover planning: including stereo imagery from multiple cameras, 3-D terrain wedges and meshes, correlation maps
- o Automates tactical analyst procedures, implements cost saving measures, and integrates IDS PGEs
- o Supports Pipeline deployment and post-deployment verification activities
- o Trains Pipeline operators on correct usage of the system and provides tactical operations support
- o Responsible for PLACES, an API built in Java and used by rover planners and mapping specialists to store and search the rover's position and attitude throughout its traverse

**SYSTEMS ENGINEER** / January 2017 - 2023

Planetary Data Systems Imaging Node (IMG)

- o Architected, designed, and oversaw development of the [Image Atlas](#), a system offering an "Amazon-like" search experience for >1 PB of planetary imagery data to the scientific community. The system adheres to the microservice style, consisting of over a dozen components orchestrated by Kubernetes and running in AWS

- Participated in requirement negotiation with the project manager, data providers, mission interfaces, and various other stakeholders in the planetary science community
- Scheduled development efforts and collaborates with the cognizant engineer to ensure their correctness and timely delivery
- Interfaced with data providers to ensure timely delivery of their data to the archive
- Maintained SysML model of IMG’s software solutions
- Represented IMG at conferences both domestic and international

**COGNIZANT DEVELOPMENT ENGINEER / January 2017 - 2020**

Advanced Multi-Mission Operations System (AMMOS)

- Maintained the Web Resource Platform (“WRP”), a suite of tools and SDKs that enabled programmatic access of image products, as well as their raster data and label information. Remote execution of image processing software was bundled with the suite
- Maintained JEDI, a real-time analysis tool that rendered data products and their metadata as they are processed. Adapted JEDI for the InSight project
- Provided operational support and training
- Prototyped WRP Tiling Service, which leveraged the WRP Product Repository technology to cache image tiles in DZI format and provided them on-demand to clients such as OpenSeadragon

**SOFTWARE ENGINEERING INTERN / Summer 2016**

Jason-3

Worked with the Jason-3 team to redesign the pipeline used to ingest, parse, and process Jason-3 telemetry.

**SOFTWARE ENGINEERING INTERN / Summer 2015**

Ocean Surface Topography Mission / Jason-2

Worked collaboratively with another intern to develop a visualization suite to assist the Ocean Surface Topography Mission in analyzing Jason-2 telemetry.

## EDUCATION

**MASTER OF SCIENCE, COMPUTER SCIENCE / August 2017 – December 2020**

University of Southern California, Los Angeles, USA

**BACHELOR OF SCIENCE, MATHEMATICS / August 2013 – December 2016**

Evangel University, Springfield, USA

## SELECT PUBLICATIONS

“Searching the Stars with Atlas IV” (2022, Madrid, Spain). <https://kevinmgrimes.com/post/search-stars-atlas4-2022-update/>. Grimes, Kevin M.; Soliman, Tariq K.; Natha, Anilkumar M.; McAuley, Michael M. Presented at Planetary Science Informatics and Data Analytics conference.

“Cloud Processing of PDS Archival Products” (2021, virtual). <https://kevinmgrimes.com/post/cloud-pds-archive-processing-post/>. Grimes, Kevin M.; Verma, Rishi; McAuley, Michael M.; Soliman, Tariq K.; Taylor, Zachary M. Presented at the 5th Planetary Data Workshop.