Dardo D Kleiner || Computer Scientist

(w) dardo.kleiner@nrl.navy.mil | 202-404-7019
(p) dardokleiner@gmail.com | 301-741-0885
LinkedIn: dardokleiner GitHub: dardok

Summary

An experienced software and systems professional with over 30 years of employment in the field of Computer Science. From work in early Artificial Intelligence/Neural Network research, to commercial software development in the medical and accounting industries, to substantial contribution towards numerous successful projects for customers and sponsors in the Department of Defense (DoD) and Intelligence Community (IC) - has both broad and deep subject matter expertise in software and systems research, planning, development, and engineering across a wide range of compute, storage, and networking technologies. Working independently or as lead or member of a team - maintains a focused work ethic and excellent communication skills, is highly regarded by both colleagues and customers alike, keeps a keen eye on rapid progress in relevant technologies for applicability to the broader mission, and continuously strives for both technical and personal improvement.

Experience

US Naval Research Laboratory (Computer Scientist) Washington, DC
Research Networks, Code 5591 - Center for Computational Science (CCS) *July 2023 - present*

- **Role**: As lead of the Advanced Technology Research & Development Environment (ATR&DE) within the CCS, continues pioneering advanced technology engineering concepts and integration tasks for customers, sponsors, and other DoD and IC scientists and researchers. Widely recognized as a domain expert - advisor, consultant, and performer in the practical application of cutting-edge technologies such as InfiniBand (IB) and Remote Direct Memory Access (RDMA) and other high performance network fabrics for compute (MPI/MapReduce/TensorFlow) and storage (SAN/NAS, e.g. CXFS, Lustre, Ceph, NVME), 3D graphics (OpenGL/Vulkan), GPU acceleration (OpenCL/CUDA), geospatial information systems (GIS), "cloud" (public - AWS/GCP/Azure, private, or hybrid virtual machine and/or container infrastructures - e.g. Kubernetes), and the GNU/Linux operating system (kernel, application, & network development, scalable and secure provisioning and configuration management, performance optimization). Has written, published, and presented papers in several workshops and conferences. Experienced and skilled in full lifecycle software development tasks from requirements gathering and expectation management to team building and agile programming techniques delivering robust, sustainable solutions for mission-critical systems.

US Naval Research Laboratory (Contractor/CIPS) Washington, DC
Research Networks, Code 5591 - Center for Computational Science (CCS) *March 2000 - July 2023*

- **Role**: As member and now lead of the Distributed Computing Group within the CCS, more than 20 years pioneering advanced technology engineering concepts and integration tasks for customers, sponsors, and other DoD and IC scientists and researchers. General and specific project highlights include the following:
- **MORN FFD/DNC**: Mission Oriented Reconfigurable Networking - Fast Fault Detection/Dynamic Network Control
  - Architecting and developing a network probe application (FFD) that seeks to quickly identify network failures including approximate physical location by way of sophisticated packet timestamp analysis.
  - Architecting and developing a network control application (DNC) that abstracts provisioning tasks across a variety of heterogeneous systems, integrated with the fast fault detection probe supporting rapid path reconfiguration around network failures.
  - Deploying FFD and DNC in a larger collaboration effort with several other interoperating components towards a global situational awareness suite for rapid intelligence acquisition, with both unclassified and classified instances.
  - Authoring technical proposals and white papers for several sub-projects of a larger team effort, including evaluating standards and industry best-practices for applicability to the customer needs.
  - **Keywords**: Network Software Development, C, Python, RDMA, PTP (IEEE 1588), SDN
- **SC(Supercomputing)/Pipelines**:
  - Shaping demonstrations and experiments in support of NRL's persistent presence at the high-profile annual SC (formerly Supercomputing) conference - the International Conference for High Performance Computing, Networking, Storage and Analysis.
  - Forging alliances and teaming with partners in government, academia, and industry to integrate, evaluate, and demonstrate cutting edge HPC technologies relevant to the DoD mission.
  - Interfacing with VIP sponsors and other audiences in showcasing and promoting NRL capabilities and collaboration efforts across government and commercial sectors.
  - Configuring systems, storage, and networks towards advanced experiments in areas such as distributed computing, global data access, and software-defined networking.
  - Supporting continued sustainment of on-site as well as remote systems deployed at partner sites, preparing and configuring compute, storage, and network environments in preparation for each year's conference as well as year-round experiments.

    - Developing software to efficiently utilize high-performance wide-area networks to distribute ingest, processing, and display of high-definition video streams across the best available resources in near-realtime.
    - Converting academic/proof of concept mathematical code to a high-performance, robust, and reusable/modular media framework for application to a much wider set of input sources, transform filters, and output sinks.
    - Publishing and presenting work at the IEEE Applied Imagery Pattern Recognition (AIPR) Workshop held in Washington, DC in 2016.
    - **Keywords**: C, Python, CUDA, GStreamer, InfiniBand, Ethernet, RDMA
- **R&D Administration/DevOps**:
    - Defining, configuring, maintaining, and evolving a large-scale (50-200 systems) computer environment for CCS R&D efforts.
    - Influencing and aligning architectural design and implementation decisions across R&D and operational components towards consistency and sustainability of the larger environment.
    - Administering R&D operating system and software installation over many heterogeneous systems, from workstations to clusters to display walls to large supercomputers.
    - Administering R&D InfiniBand and Ethernet network equipment (e.g. Subnet Managers, VLANs, port security, etc.) and SAN/NAS storage systems (LUN allocation, RAID setup, multipath).
    - Securing, monitoring, and auditing all systems using best-practice techniques and tools such as Nagios, Zenoss, Grafana, Prometheus, etc.
    - Deploying, maintaining, and utilizing several generations of Source Control Management (SCM) and Continuous Integration (CI) systems in support of development projects (e.g. GitLab, Jenkins, Travis, etc.).
    - **Keywords**: Shell, Ansible, Puppet, Configuration Management, Linux (SuSE, RedHat, Gentoo), Ceph, Lustre, InfiniBand, Ethernet
- **DNN T&T**: Distributed/Dense Neural Network Testing & Training Enclave
    - Designing and implementing a modern "cloud HPC" stack supporting developers, data scientists, and users iterating on imagery analytics pipelines (i.e. the Joint AI Distribution Experiment - Training and Deploying Machine Learning (ML) Analytics for Tactical Applications).
    - Architecting and developing cloud-agnostic infrastructure tooling for deployment of a container orchestration stack (Kubernetes) across cloud, on-premise, and developer environments - complete with defense-in-depth security policies across compute, network, and storage, as well as robust fault-tolerant design and monitoring/alerting components.
    - Architecting and developing container deployment tooling supporting the installation of a complex multi-tier microservice application suite (AVAA - Advanced Video Activity Analytics) on any Kubernetes orchestration stack.
    - Collaborating with multi-agency performers on the Ordnance Threat-Target Automated Recognition (OTTAR) project - an ML-oriented effort aimed at robust classification of unexploded munitions - assisting the customer with architecture and implementation considerations as well as developing large-scale HPC-based ML workflows for data scientists.
    - Deploying and administering cloud operator stacks supporting "as a service" features such as high-availability replicated databases (PostgreSQL) and machine learning workflows (Jupyter notebooks, TensorFlow model training and serving).
    - Configuring and administering an on-premise deployment of Kubernetes container orchestration backed by high-performance compute (GPU), networking (InfiniBand & Ethernet/RDMA), and storage (Ceph/Lustre).
    - Participating in agile development workflow with a large team - i.e. scrums, sprints, program reviews, collaboration portals; preparing documentation and presentation materials; onboarding team members and mentoring junior developers.
    - Advising DoD and IC policy and decision makers on advanced technology concepts and high level architecture roadmaps.
    - **Keywords**: Machine Learning, Kubernetes, Containerization, Virtualization, AWS/GovCloud/C2S
- **BF**: BigFoot
    - Supporting deployment and testing of a distributed satellite signal processing platform leveraging hybrid cloud & on-premise HPC to scale compute tasks towards timely intelligence product delivery to end users.
    - Optimizing performance characteristics and developing benchmarking software for high-performance wide-area direct filesystem and data mover applications facilitating rapid compute access to source material.
    - Administering and onboarding team developers to an unclassified testbed representing operational deployments.
    - **Keywords**: InfiniBand, Ethernet, RDMA, Lustre
- **C4ILE**: Command, Control, Communications, Computers, & Intelligence (C4I) Learning Environment
    - Contributing expertise in large-scale configuration management towards rapid deployment of high-performance infrastructure supporting evolving mission requirements
    - Developing an automated bare metal cluster deployment system from base operating system up to a secure on-premise virtual machine provisioning appliance.
    - Leveraging modern configuration lifecycle tools like Ansible to enable "single source" specification of an entire system and automate the installation and configuration of all the servers with minimal user interaction.
    - Designing a staged-deployment method, starting with base bare metal operating system, building a software-defined block storage service based on Ceph, and finally autoconfiguring a fault-resilient Lustre cluster with an enterprise InfiniBand storage backend.

    - Ensuring systems are "STIG" compliant at first boot, supporting ease of accreditation particularly for this Secret-level classified environment.
    - **Keywords**: Ansible, Configuration Management, Linux (RedHat), Ceph, Lustre
- **NRcLoud**: Multi-site replicated near-realtime storage system
    - Developing, launching, and administering a custom shared file system over a cutting-edge commercial distributed object storage appliance (DataDirect Networks (DDN) Web Object Scaler (WOS)).
    - Teaming with administrators at the main NRL campus and the Monterey and Stennis field sites towards installation of the 3 x 1 Petabyte systems at each location.
    - Working with users in establishing workflow, configuring secure access, and enabling them to share scientific data with other researchers in the NRL community.
    - Implementing a distributed software application that presents the object storage as a POSIX filesystem, utilizing the vendor's storage system for the data (with replication) and a PostgreSQL database for metadata (with asynchronous/eventual consistency across the wide-area via an Advanced Message Queuing Protocol (AMQP) platform).
    - Installing, configuring, and maintaining a complete infrastructure (e.g. Kerberos, LDAP, InfiniBand, IP tunneling & routing) supporting POSIX-like access over the non-traditional object paradigm.
    - Configuring an InfiniBand to IP routing layer whereby the WOS and AMQP synchronization protocols had to be passed from the local IB networks over the traditional IP used by the interconnecting wide-area Defense Research & Engineering Network (DREN).
    - **Keywords**: DDN Web Object Scaler (WOS), C++, PostgreSQL, Python, AMQP/RabbitMQ, Linux, FUSE (Filesystem in Userspace), InfiniBand
- **S4**: Secure Shared Storage Service
    - Designing a large-scale secure cloud-based file sharing architecture for an NRL IC customer.
    - Advising and educating decision makers regarding benefits as well as pitfalls associated with utilizing third-party infrastructure (aka cloud) to store and process mission-critical data.
    - Evaluating and assessing both commercial and in-house software for end system or near-edge proxy encryption of sensitive special access program information.
    - Preparing and delivering a comprehensive vulnerability assessment and demonstration as well as an evaluation and recommendation report to the customer.
    - **Keywords**: Microsoft Windows, SharePoint, CipherPoint, Encryption, Cloud
- **GSDR**: Global SOF Directory & Repository
    - Designing and implementing a web-based application for maintaining and disseminating SOCOM international partner contact information.
    - Guiding team in assessing customer requirements towards effective user interface design and accessibility standards.
    - Designing and implementing an ETL (Extract/Transform/Load) process for converting the Excel-based data collection into JSON for display on a 3D globe user interface.
    - Installing, configuring, securing, and maintaining systems running the web services in support of the Internet-accessible application.
    - **Keywords**: HTML/CSS/JavaScript, Angular, Cesium, WebGL, Python, Apache
- **DIVSS**: Distributed Interactive Visualization & Synchronization System
    - Architecting and implementing a geospatially enhanced collaboration suite for the SOCOM sponsor.
    - Extracting and advancing sponsor requirements and aligning these with realistic project deliverable timelines.
    - Working with vendor to customize a web-based map synchronization tool for shared situational awareness.
    - Installing, configuring, and administering a multi-site infrastructure in support of the collaboration application, including large tiled displays and conference room integration at NRL and SOCOM facilities.
    - **Keywords**: HTML/CSS/JavaScript, Python, iSpatial
- **IPLProxy**: Image Product Library Proxy
    - Working with a large team to design, prototype, and field some of the earliest tactical mobile application deployments for the DoD/IC - disseminating large-format geospatial imagery to handheld devices over rapidly deployable containerized compute+4G systems.
    - Developing a near-realtime caching proxy that enabled low-power edge systems to search for and navigate over very large geospatial imagery product served by a legacy application designed for traditional well-connected clients.
    - Working with other contractors and vendors to deploy prototypes to interoperability demonstration events for VIP partners and stakeholders.
    - **Keywords**: Python, GDAL, PostgreSQL/PostGIS, Android/iOS
- **LD JCTD**: Large Data Joint Capabilities Technology Demonstration
    - Architecting wide-area network filesystem for direct remote access to large geospatial imagery files in support of several DoD and IC sponsors.

    - Spearheading cutting-edge implementation for high-performance data ingest, retrieval, and processing at a global scale, while providing timely, actionable intelligence to analysts and other end users.
    - Staging complete system for classified deployment - including base services such as Kerberos, OpenAFS, DNS, & NIS.
    - Installing, configuring, and administering unclassified testbed environment in support of continued enhancements to deployed system.
    - Enhancing vendor software for user access to search/filter/download selected geospatial imagery from the overall collection.
    - 2009 JCTD Team of the Year award recipient.
    - **Keywords**: InfiniBand, CXFS, Lustre, OSSIM, OMAR, PostgreSQL/PostGIS
- **Rampant Lion I/II**: Afghanistan Imagery Dissemination Service
    - Partnering with the NRL Rampant Lion acquisition team to establish a dissemination architecture for this one-of-a-kind dataset - a high-resolution image capture of a significant portion of the country of Afghanistan.
    - Processing large collection of geospatial imagery collected by the NRL researchers into formats suitable for public web access.
    - Developing web application enabling search and download of processed geospatial imagery.
    - Supporting high-performance filesystem backing clustered web servers for enhanced system scalability.
    - Architecting, configuring, and supporting high-performance InfiniBand campus connection between R&D networks on the lab.
    - Coordinating, updating, and securing system for second round of imagery collection (Rampant Lion II) restricted to DoD and authorized contractors.
    - **Keywords**: HTML/CSS/JavaScript, Python, Mapserver, Lustre
- **MIL**: Motion Imagery Laboratory
    - Curating and administering a large multi-projector immersive display environment for prototyping and demonstrating R&D projects to sponsors and other VIP audiences.
    - Working with team engineers to calibrate, tune, and upgrade the unique curved projection surface over three generations of projector technologies (up to latest 4k HD).
    - Adapting software over several generations of source graphics engines, from the original SGI Origin supercomputer to several variations on rack-and-stack cluster GPU systems.
    - Leveraging and/or contributing to commercial and open source projects enabling synchronized visualization of massive geospatial datasets across multiple displays (e.g. projection walls, tiled monitors) - pioneering the "Zoomable User Interface" (ZUI) paradigm later popularized by well-known systems such as Google Earth (originally Keyhole, an early visitor to our site).
    - **Keywords**: OpenGL, OpenSceneGraph, SGI Performer, Equalizer, InfiniBand, RDMA
- **CHIME/Optiprism**: Optical Network Management System Framework & Application
    - Planning and coordinating development of first-generation Java "mobile agent"-based framework.
    - Identifying software control plane requirements for several proprietary optical switches.
    - Leading team in design and implementation of software emulators for physical network elements.
    - Interacting with end-users (optical scientists) for NMS feature requirements.
    - Supporting NMS application after deployment: e.g. end-user support, bug fixes, feature additions.
    - Presenting research work at the Mobile Agents for Telecommunications Applications (MATA) Conference held in Montreal, Canada in 2001.
- **IDOL**: Interactive Distributed Object Library - next-generation Java "mobile agent"-based framework
    - Coordinating two development teams (visualization & networking) and working extensively with SGI Performer and Java3D (high performance 3D APIs) in extending existing monolithic database MoaDB (Mother of all Databases) visualization application into fully distributed mode where data feeds are delivered via network instead of pre-cached on local disk. Implementing alternative viewer in Java3D for non-Performer-enabled platforms. Working with Java on small devices such as the iPAQ in order to include a wide spectrum of hardware capabilities in the final distributed application.
    - Identifying software requirements for management of multi-terabyte geospatial information databases. Enabled scalable data set navigation by distributing data sources across available resources. Part of this task involved automated processing (e.g. converting, compositing, registering) of huge databases of satellite imagery, and enabling the incorporation of new imagery at run time (via scripts and other custom-written tools).
    - Leading team in design and implementation of distributed "meta scene graph" protocols for describing geospatial data sources across the wide area.

Computer Integration & Programming Solutions (CIPS), Corp. Bethesda, MD

Software Product Engineer & System Administrator *June 1994 - February 2000*

- **Role**: Both developing software as well as administering a small business computer infrastructure - principal architect of a medical software package and primary custodian of both the internal and external support systems:
- **FrontDeskMD**: Designing, developing, and implementing a full-featured physician's patient tracking and scheduling system. Converted original C-based system into Delphi/Interbase Application System with support for advanced features such as graphical user interfaces and a distributed client/server architecture.

- **Administration**: Installing and administering complete corporate network consisting of Windows NT, Linux, and FreeBSD servers providing authentication, remote access, file storage, and printer resources to a variety of client platforms, including Windows 95/98, Linux, and Macintosh. Additionally implemented and maintained enterprise software packages providing network services such as web servers (Apache, IIS, Domino), database back-ends (SQLServer, Oracle, Interbase, MySQL), and secure access protocols (SSH, VPN, IPv6/IPSEC).
- **Back Office**: Implementing and administering Lotus Domino groupware solution for enterprise e-mail & web hosting, including full design and deployment of a Domino-based corporate web site as well as several in-house enhancements (mail forwarding agents, archive profiles, et al) utilizing Lotus Notes database development interfaces.

Cost Accounting Software & Services, Inc. (CASSI) Rockville, MD
Software Consultant *June 1996 - April 1998*

- **Role**: Initially supporting existing government contractor accounting package by developing additional reports and processes. Later revised original DOS-based system to include support for advanced features such as graphical user interfaces and a distributed client/server architecture.

Kodak Rochester, NY
Student Programmer *November 1992 - March 1993*

- **Role**: Developing an auto-scheduling/optimization software system to improve production efficiency of film coating stations.

Naval Surface Warfare Center (NSWC) White Oak, MD
Student Analyst *September 1989 - August 1991*

- **Role**: Researching and implementing artificial neural net systems tasks of varying degrees of complexity. Supported mathematicians in converting pure algorithms to computer implementations. Effectively designed and developed software for feature extraction, optimal path computation, automatic target recognition, and advanced real-time kill assessment.

Maryland Computer Systems Colesville, MD
Computer Technician *August 1988 - November 1988*

- **Role**: Assembling, testing, and installing customer PC systems.

Publications/Technical Writing

- **Streaming detection and classification performance on a POWER9 edge supercomputer**:
  Authors: Wesley Brewer, Chris Geyer, Dardo Kleiner, Connor Horne
  IEEE High Performance Extreme Computing (HPEC) Virtual Conference, September 2021
- **Project Deliverable : S4 (Secure Shared Storage Service) Evaluation & Recommendations**:
  Authors: Dardo D. Kleiner, Linden Mercer, Lou Berger
  NRL/IC S4 Project, July 2017
- **Stream Implementation of the Flux Tensor Motion Flow Algorithm Using GStreamer and CUDA**:
  Authors: Dardo D. Kleiner, Kannappan Palaniappan, Gunasekaran S. Seetharaman
  2016 IEEE Applied Imagery Pattern Recognition Workshop, AIPR 2016, Washington, DC, USA, October 18-20, 2016. IEEE Computer Society 2016, ISBN 978-1-5090-3284-6
- **The Effect of Wavelength Advertisement on the Performance of an Optical Routing Protocol**:
  Authors: Bilal Khan, Dardo D. Kleiner, David Talmage, Abdella Battou
  Proceedings of the IEEE 2004 Global Communications Conference (GLOBECOM), 29 November - 3 December 2004, Hyatt Regency Dallas at Reunion Hotel, Dallas, TX
- **The Buck Stops Here: Trust Management in Multi-Agent Systems with Accountability**:
  Authors: Bilal Khan, David Talmage, Dardo D. Kleiner
  Proceedings of the 2004 IEEE 1st Symposium on Multi-Agent Security & Survivability (MAS&S), 30-31 August 2004, Drexel University, Philadelphia, PA 19104
- **Towards an Agent-Based Distributed Hierarchical Network Management System for All-Optical Networks**:
  Authors: Bilal Khan, Dardo D. Kleiner, David Talmage
  Mobile Agents for Telecommunication Applications, Third International Workshop, MATA 2001, Montreal, Canada, August 14-16, 2001, Proceedings. Lecture Notes in Computer Science 2164 Springer 2001, ISBN 3-540-42460-1

Education

Rochester Institute of Technology (RIT) Rochester, NY
Bachelor of Science *1994*

Major: Computer Science

Minor: Numerical Analysis

References

Available Upon Request