

RICK SARMENTO
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PROFESSIONAL SUMMARY

I am currently a 5th year PhD candidate (Astrophysics) at ASU where I study the transition from the first to the second generation of stars in the early universe. I use very large scale simulations running on 1000+ CPUs to model large scale cosmology and the mixing of supernova ejecta via state-of-the-art sub-grid models of turbulent flows.

I have 25+ years of experience in software design, analysis and development. My experience ranges from the development of custom telemetry processing and analysis tools for an Orbital launch vehicle (rocket) to the development of a distributed, multi-threaded, satellite simulation on a cluster of Intel-based LINUX machines. My strengths are the analysis and design of complex and/or analytic algorithms.

I also have extensive experience in requirements analysis as well as project management.

SKILLS

System Engineering: Knowledgeable software requirements analyst able to take projects from inception/elaboration through to development, test and delivery.

Technical Management: Experienced software development project team leader. I currently head a team of 4 software developers.

Software Engineering/Development: I am an expert **C/C++** developer in the **Linux** environment. Have experience with Smart Bear **Software Planner & Code Collaborator** as well as **Clear Case** and **GIT** revision control systems. I have used several software libraries and tools (e.g. – **ACE**, **boost**, **MySQL**, **MONGO**, **SCTP/TCP**, **XML**). I have worked with **JAVA** and do a lot of work with **Python**. I also have recent experience in **Fortran 90** (cosmological modeling for my dissertation work).

Entrepreneur/ Leadership: I am one of the founding members of *KinetX*, Inc. KinetX currently employs more than 50 engineers and support staff. I am the Commanding Officer of the Office of Naval Intelligence 0194 unit based in Camp Parks, CA.

Scientific Researcher: I am a research scientist/grad student at ASU using my software skills in computational astrophysics.

EXPERIENCE

Astrophysics **2015 – Present**
Researcher Assistant, ASU AZ

Graduate student and research assistant with a primary focus on star formation in the early universe where I use numerical techniques and large scale cosmological simulations.

Boeing, Chandler AZ **2005 – Oct 2015**

Hosted Payload Ops Center – Software Dev Lead 2013- present

Lead software engineer for the IRIDIUM satellite **Hosted Payload Operations Center**. I am responsible for requirements analysis, design and development of the Hosted Payload Operations Center. The Hosted Payload is an aircraft transponder receiver payload on the NEXT IRIDIUM satellite. The Hosted Payload (HPL) receives aircraft transponder broadcasts, converts them to aircraft tracks and forwards the information to NAVCANADA and the FAA.

IRIDIUM Ground System - Senior Software Engineer**2005-2013**

Software systems engineer for the IRIDIUM satellite constellation. Responsible for designing and implementing fixes and enhancements to IRIDIUM ground control software. Primarily responsible for Mission Planning and Control software. Software developed in C++ on a UNIX network with distributed object infrastructure.

Part of IRIDIUM NEXT (replacement satellite network) design team. Perform system requirements analysis for the purposed system. Team lead for Hosted Payload Controller development.

Key Accomplishments:

Analyzed the IRIDIUM satellite network to determine likely failure modes and associated mitigation strategies. Designed and developed a methodology & software to schedule connectivity to disconnected satellite sub-networks using otherwise idle ground resources.

Mapped SVs with component failures and special constraints to pseudo-SVs so that the linear constraint model could be used to generate contact schedules.

Supported requirements development for the IRIDIUM NEXT Preliminary and Critical design reviews.

Orbital Sciences, Chandler AZ**2003 – 2004**

Senior Software Engineer – Launch Vehicle Telemetry

Designed and developed C++ telemetry processing and analysis software for Orbital launch vehicles.

Spectrum Astro, Gilbert AZ**1999 – 2003**

Senior Software Engineer – Low Earth Orbit Constellation Simulation

Developed a simulation of LEO constellation for theater level missile warning system on a cluster of Linux PCs. Technologies used include C++ and OpenGL as well as in-house developed graphics libraries.

Key Accomplishments:

Developed a simulation of a constellation of LEO satellites providing synthetic aperture radar and moving target indication (MTI) data for in-theater military commanders. Developed OpenGL based application to display MTI data as detected by simulated satellites and ground-based moving targets.

Successfully demonstrated Discoverer II simulation and associated technology to high-ranking military and government customers.

MILITARY**CDR, US Navy Reserve, Intelligence Officer (1835)****1998 – present**

Commanding Officer (CO), Office of Naval Intelligence, 0194 Dec 2016 – Present**Camp Parks, CA Detachment**

Commanding Officer of Office of Naval Intelligence, 0194 unit in Camp Parks CA. Responsible for training and manning of 44 sailor unit that provides direct support to the Office of Naval Intelligence, Washington, DC.

Executive Officer (XO), Joint Forces Dec 2013 – Dec 2016**Maritime Component Cmdr, PHX Detachment**

Executive Officer (previously operations department head) for Joint Forces Maritime Component Commander (JFMCC). Provide operational-level-of-war support to Commander U.S. THIRD Fleet for JFMCC.

Naval Strike and Air Warfare Center **Apr 2007 – Nov 2013**
Senior tactical strike warfare intelligence instructor. Responsible for training active duty intelligence officers in naval aviation tactical warfare intelligence doctrine. Positions held: Admin Dept Head, Ops Dept Head

Helicopter Combat Support **Nov 2006 – Mar 2007**
Deployed to central Iraq with HSC 84 in support of combat operations. Squadron N2 supporting Commander, Joint Special Operations Air Component, Arabian Peninsula (CJSOAC-AP). Responsible for briefing aircrews as to enemy threat before flying into combat.

Helicopter Combat Support **Jan 2004 – April 2004**
Deployed to central Iraq with HCS 4 in support of combat operations. Squadron intel officer and duty officer.

Fighter-Attack Squadron 201 **2003 – Apr 2007**
Responsible for gathering, analyzing and briefing tactical intelligence to F/A-18 crews. Oversight of intelligence enlisted personnel.

Naval Strike and Air Warfare Center **2000 - 2003**
Tactical strike warfare intelligence instructor and instructor-instructor. Responsible for training active duty intelligence officers in naval aviation tactical warfare intelligence doctrine.

Personal Awards:
Navy Achievement Medal (x4), Navy Commendation Medal

ACADEMIC

Received ASU Summer Research Award (\$1750), May 2014

Part of the JINA-CEE collaboration: The Joint Institute for Nuclear Astrophysics – Center for the Evolution of the Elements (<http://www.jinaweb.org/>). My research focus in the high redshift universe ($z > 4$) where I have modified a large-scale cosmological simulation (RAMSES) to track metal mixing via turbulent flows. Such simulations allow me to predict several characteristics of this cosmic epoch (first billion years) including the abundance and distribution of Pop III stars, the composition and distribution of metals in the gas, as well as the abundance of Pop II stars formed polluted with ejecta (with unique abundance patterns) from Pop III stars. This modeling may explain the abundance of old, Carbon-enhanced metal-poor stars (CEMP) in the Milky Way halo.

Posters/Talks

JINA – CEE Forging Connections - Poster **Jun 2017, MSU, MI**
Exploring the Progenitors of Carbon-Enhanced Metal-Free Stars

JINA – CEE Frontiers Conference - TALK **Feb 2017, MSU, MI**
Metal mixing and MW CEMP-no stars

RAMSES User's Group Conference - TALK **Oct 2016, Paris, FR**
Following the Cosmic Evolution of Pristine Gas I:
Implications for Milky Way Halo Stars

JINA – CEE Frontiers Conference - POSTER **Mar 2016, Notre Dame, IA**

The Evolution of the pristine gas: Implications for Milky Way Halo Stars

RAMSES User's Group Conference - TALK
Simulating the evolution of the pristine gas via turbulent mixing

Sept 2015, Oxford Univ., UK

JINA – CEE Frontiers Conference - POSTER
Simulating the evolution of the pristine gas via turbulent mixing

Mar 2015, Mich State Univ., MI

Refereed Publications

Following the Cosmic Evolution of Pristine Gas I: Implications for Milky Way Halo Stars

ApJ - Jan 2017

Sarmento, R., Scannapieco, E., & Pan, L. 2017, *Astrophysical Journal* , 834, 23

Following the Cosmic Evolution of Pristine Gas II: The Search for Pop III Bright Galaxies

ApJ - May 2017 – *In review*

Sarmento, R., Scannapieco, E., & Cohen, S. 2017

Proposals

Simulating the Evolution of the Elements Generated by the First Stars

Oct 2016 – XSEDE SC Cluster

5 million CPU hrs awarded

EDUCATION

BS Computer Science:

University of California, Irvine

1982 - 1986

Astrophysics, Masters of Science:

Arizona State University

Dec 2016

Astrophysics, PhD (*In progress*):

Arizona State University

DOD CLEARANCE

TS/SCI - Current

HOBBIES

Triathlon (Completed IRONMAN AZ in 2011)

Pilot – Instrument rated with more than 700 hours in single engine aircraft

Woodworking/wood turning

Exercise/Hiking/Camping